DISPUUT TRANSPORTKUNDE PANDORA

NetwerkNieuws.

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Recent Activities

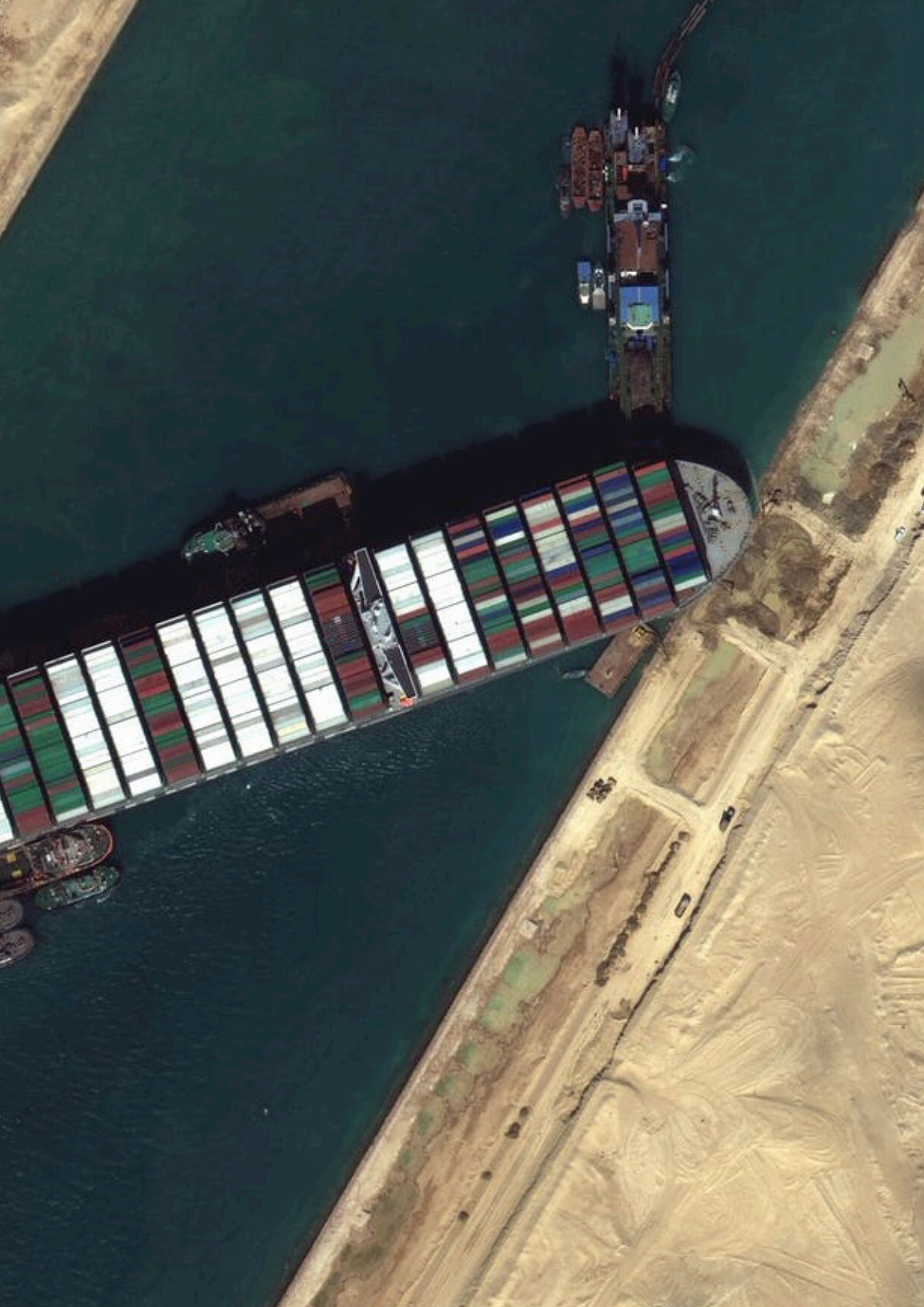
The online edition

From a PhD Student

Dynamic Fleet Management for Autonomous Vehicles

Coronavirus

The impact on students & educators



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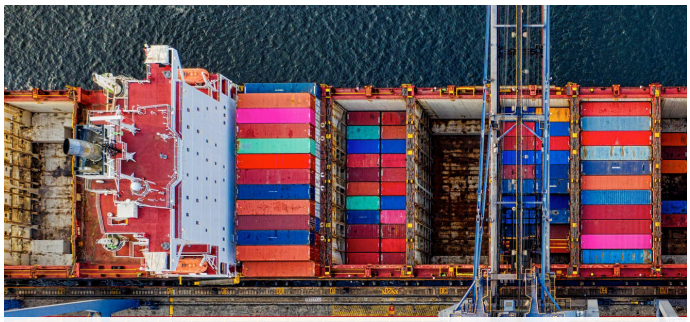

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Colofon

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FROM THE BOARD

By: Board 2020-2021

Dear reader,

In October we started our board year full of confidence and ideas. This COVID thing would pass and we would be able to organise lunch lectures and excursions and get to know our fellow MME students. As we all know now, it did not turn out like that.

It has been a period with peaks and valleys. For six valuable weeks we could come to the university every Tuesday morning, where Wouter van den Bos would guide us in building a Finite Element Model of our chosen crane. An opportunity to not only experience real life education but also to talk to our fellow students. With only one evening of introduction activities and all educational activities taking place online, it has become very difficult to get to know our fellow students and create a close connection between them. Since April 26th, we again have the ability to enter the lecture halls once a week. We are overjoyed with this opportunity to continue developing ourselves as master students, both academically and socially. Although this is an opportunity we truly value, this academic year has mostly consisted of studying from home. This has been challenging for us personally, for us as students and for us as a board.

We have filled this NetwerkNieuws with articles to entertain you in this challenging time, but above that, articles that will update you on the developments in education and the industry. It will start with a contribution from Rudy Negenborn and Mark Duinkerken in “From the Staff”. In a year like this it has been particularly challenging to organise events, both social and career related. But with some creativity and a lot of perseverance, we have worked hard to organise some events, as our Secretary, Koen, will tell you in the “Activities” piece. Then, this year’s Business Tour Committee will tell us about their plans for the annual excursion filled trip. Also, Royal HaskoningDHV has contributed with an article on one of their current projects, still allowing us to stay up to date with the companies in the industry.

Another large consequence of the global pandemic is that one of the essential parts of being a student, studying, is being put to the test. All education has been online, in the form of online lectures on Teams and constant project meetings on Zoom. This is extremely challenging for both students and teachers. That is why our Commissioner of Education, Carolina, has included an education piece featuring experiences from two students and a teacher with this new form of education. Luckily not everything has to change and MMEs PhD students can continue their research. Breno Alves Beirigo has contributed to this edition by telling about his research in “From a PhD”.

All in all, we can not say we expected the first half of our board year to look like this. That does not mean we have been sitting idly by while it passed us by. Apart from the extensive energy we put into the events we are able to organise, we have been focusing on improving the website, the LinkedIn, our alumni database and the education evaluations. Also we have made every effort to fill this edition of the NetwerkNieuws with interesting articles for you to read. We hope you enjoy it!

On behalf of the board,

Gitte Hornung, Chair •

Did you know:

The Suez Canal was blocked for six days in March 2021?

FROM THE STAFF

By: Rudy Negenborn & Mark Duinkerken

Dear MME & TEL Students, Dear Alumni,

About a year ago, we were just in the middle of the first lockdown period and the university had just closed. At that time, we wrote in our 'From the Staff' for NetwerkNieuws about the boost that we gave to developing online Multi-Machine Engineering (MME) education, the introduction of all kinds of tools to help the students carry on their studies as much as possible, and the steep learning curve that we as staff had in order to give students good feedback and supervision with all kinds of online communication means--And this has certainly paid off!

Of course, it is very unfortunate that also now, about a year later, we are facing a pretty similar and tough situation, especially on the social side. Yet, at the same time we see that both teachers and students have, with mutual understanding for each other's situation and efforts, mostly found a way to keep the MME learning experience at the right and high level. This is also clearly illustrated by the numerous successful MSc graduation projects that we have been able to celebrate over the last year; public MSc defences that have been attended by much larger groups of participating friends and family, enabled by the online classroom environments. If you would like to join the public MSc defences online, please let us know. Would you also like to join the defences of graduating PhD candidates? You can find more information on how to do so for upcoming PhD defences in the 'News' section on the department's website: **http://mtt.tudelft.nl/about-mtt/news/.**

This study year we have welcomed again more new students for the Multi-Machine Engineering track, continuing the growth from the year before. This is for us a confirmation for the attractiveness and positioning of the MME program. We keep reflecting on the coherence and relevance of the study activities offered, now also in consultation with the KIVI Transport & Logistics Section. A first consultation round brought to our attention the interest in emphasizing more project management and cost calculation aspects. If you see any other important aspects to add to the program, please do not hesitate to let us know!

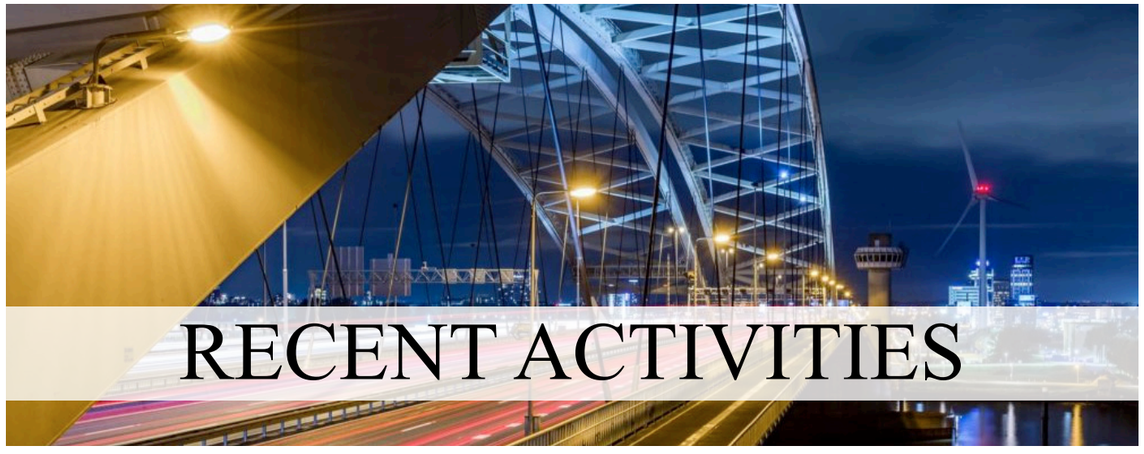
Now moving towards the end of academic year 2020/2021, we are looking forward to a new group of students having successfully completed their first year courses, and soon starting their 2nd year in which they will work on individual literature, research and graduation projects. What the students hereby really enjoy is being able to bring in their creativity, critical attitude, and acquired competences to contribute to ongoing projects. These can be research projects, mainly led by researchers in our group, or more applied projects in close cooperation with industrial and societal partners. Hence, if you see interesting MME related problems in your environment, don't hesitate to contact us. We are happy to discuss if and how such a problem could become a suitable basis for a 2nd year project, and announce the possibility to students. This is especially in these times important to pay attention to, as it is much harder for students to get in contact with industry due to the study and working from home restrictions.

Besides the educational activities, we have as staff been actively involved in the 2020 research visitation of the Faculty of Mechanical, Maritime and Materials Engineering. Every 6 years an external committee of (international) experts takes a close look at the research profile of our department (and the faculty). It is our pleasure to let you know that the committee much appreciates the profile of the department, and the combination of transport and (maritime/mechanical) engineering topics. The committee also applauds the increase in scientific output (at conferences and in journals) over the last years. This is a clear sign of the academic strength of the environment in which we offer the MME program. It is hereby also good to know that in much of the research of the department actual students from the MME program are involved, contributing to the advancement of science on the one hand, and the shaping of their academic attitude on the other. You can find out more on the renewed research themes at the department's website: **http://www.mtt.tudelft.nl/.**

For the coming months we are looking forward being able to open a vacancy for a new assistant professor with an industrial engineering focus. Needless to say, multi-machine engineering has great potential in the industrial engineering domain. Here, the philosophy of (Maritime) Industry 4.0 / 5.0 directly aligns with the MME concepts in which groups of machines need to align their operations more and more in real-time in order to optimize system wide plant performance. The to-be-appointed new colleague will not only be aware of the emerging trends in this area (Data-Driven Anything, Digital Twins, Robust SCM, …), but will also investigate new approaches and applications to steer these trends and directions. It is about understanding the more fundamental developments (human-AI collaboration, circularity, cyber-physical production, …) and proposing new MME tools that can contribute to realizing future Industry objectives on efficiency, safety, and sustainability. The new colleague will of course embed this research in education, and involve MME students in progressing the body of knowledge. Are you interested in learning more about this upcoming vacancy? And/or could you be interested in joining us as assistant professor? Feel free to let us know.

The above research and education developments, the days getting longer and brighter, and the vaccinations starting to have an effect, do give us hope that at least from September 2021 we will be able to meet you, as MME & TEL students, as well as alumni, again much more frequent at the TU Delft Campus. We are looking forward to it!

Rudy Negenborn & Mark Duinkerken •



RECENT ACTIVITIES

During the pandemic it has proven to be hard to organise activities. As a new board, the first and only activity we were able to do face to face, was our own introduction to each other. However, in spite of the regulations we still tried our best to organise online events where students could either meet each other or be introduced to interesting companies.

Online pub quiz

The first social event for this year's new MME students was an online pubquiz. Seven teams of students competed for the victory in a quiz with questions about cranes, conveyors, excavators and of course many random facts. It was a fun evening where students could finally meet and talk to one another about subjects other than studying.

Online escape room

After the success of the online pubquiz, it was time to organise another social event. This time the first year students met online to solve an 'underground murder mystery' in an online escape room. In about an hour we had to get to the bottom of a murdercase that took place in the London metro system. Afterwards there was still time to have a drink and talk to each other. All in all it was a nice break in between the many evenings of studying.

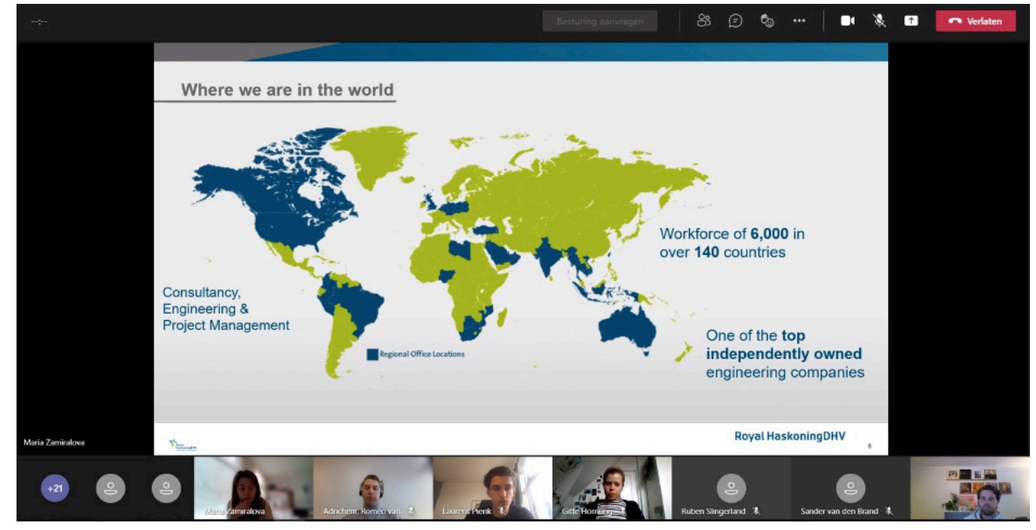
Lunch lecture Royal HaskoningDHV

Royal HaskoningDHV was the first company to host an online lunch lecture for our students to present their business and latest projects. Royal HaskoningDHV is an international engineering and consultancy firm that operates in sectors such as energy, aviation, infrastructure, urban development and much more.

In a presentation of an hour we walked through many different projects of the group specialised in supply chain, logistics simulation and operations consulting. Some of these projects were the design of ports and terminals around the world, as well as an extensive analysis of the renovation of the Van Brienenoordbrug in Rotterdam, which is planned to be done in 2025.

The students were delighted to finally see a company present real life cases of topics we study everyday. It was a useful and insightful lecture that showed us what kinds of state of the art engineering solutions are currently being developed in our field.

Royal HaskoningDHV
Enhancing Society Together



Python course with Dispuut Verkeer

As programming has become an indispensable part of any engineering field, a basic Python course was organised for our students to refresh and sharpen their programming skills. Dispuut Verkeer, the dispuut of the MSc track 'Transport, Infrastructure and Logistics', hosted three sessions of two hours, in which the basics of Python were explained by two programming experts.

The first session served as an introduction to Python. In this session the students got familiar with the basic functionalities of Python and the use of its many libraries. The second session was all about data analysis. Here, the students could try some hands on programming themselves by manipulating and extrapolating data from large data sets. Also, this session contained a short introduction to the use of machine learning algorithms in data analysis. Finally, in the last session the students were thought how to optimise linear programming problems by using the Gurobi library.

We would like to thank Dispuut Verkeer for letting our students join their event. Combining our two disputes, we were able to motivate over 35 students to participate in this three day event. Let's see what some teamwork with Dispuut Verkeer can bring us and them in the future! •

ROYAL HASKONING

Supply Chain, Logistics Simulation & Operations Consulting

Who we are?

Royal HaskoningDHV is an independent, international engineering and project management consultancy firm with over 130 years of experience. Our professionals deliver services in the fields of aviation, buildings, energy, industry, infrastructure, maritime, mining, transport, urban and rural planning, and water.

Backed by expertise and experience of nearly 7,000 colleagues across the world, we work for public and private clients in more than 130 countries. As for the Netherlands, we have 13 offices and we are planning to move to a new office in Delft in the near future.

Across our markets, effects of Covid-19 were mixed and impact on our operating income was contained. Despite this challenge, we managed to grow our profitability and maintain our healthy financial position.

Our group Resources, Logistics & Power is comprised by about 30 people, including around 15 ex-TEL (Transport Engineering & Logistics) students from TU Delft. Our group delivers various projects all over the world focused on the design of handling and storage facilities for dry bulk and logistics chain development for complex supply chains. This article will talk about new trends of project types: supply chain, logistics simulation and operations consulting.

What challenges do our clients face nowadays?

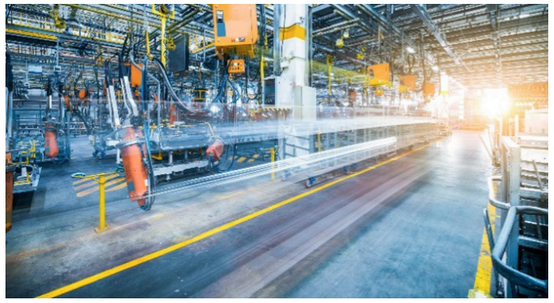
Aging Assets

Heavy industry in Europe is faced with the challenge of aging assets, especially on sites that exist for 40 years or more. The economic cycles over the past decade have had investments that were delayed or postponed. Operating within tight margins, there is more of a focus on developing efficient operations for today, avoiding risks associated with implementing innovations for tomorrow. Required frequent maintenance of equipment causes higher operational expenses of assets.

Energy Transition

Plants are forced to adopt to new government regulations and more stringent rules towards energy transition: sustainability through increased integration of renewable energy or decrease of CO_2 emissions. At the same time, implementing new sustainable technologies, plants and factories have to remain competitive. Therefore, they need our consultancy services, strategic or technical, so they can mitigate the costs involved, making the production more effective.

Royal HaskoningDHV
Enhancing Society Together



Innovation & Digitalisation

Our clients use more and more innovative tools and digitalisation to analyse, asses, control and finetune their production performance in a more effective way. For that purpose, digital twins are used as a new way of integrating data received from sites into automatic modelling and simulation processes and decision making based on both site facts and resultant simulation predictions. Compared to traditional modelling works based on manual data processing and reporting, the digital twins work based on an automated data flow between the digital twin and physical object(s).

Shift in magnitude

Most of our clients exhibit steady growth in throughputs. They tend to increase their current production throughout by: optimising existing facilities, analysing bottlenecks, increasing capacities of equipment, adding new production lines, starting production of an absolutely new product, expanding by opening new plants globally and organising new supply chains. Therefore, they ask our services on different levels: from cell or line level (optimising product flow, buffering, assembly performance) to facility level (site logistics, warehousing) and up to supply chain level (network modelling, site or production allocation).

What tools do we have?

To assist our clients with services in supply chain, logistics simulation and operations consulting we use different tools, presented in **Figure 2**.

We use **Predictive Simulation** to create dynamic Digital Twins of real-world business processes that enable companies to understand, predict and optimise the performance of their assets and business operation.

First, the major difference between machine learning and predictive simulation needs to be explained. Machine learning is effective in the analysis of big historical data based on nonlinear algorithms and mathematical functions pre-defined by data scientists. For instance, if you are planning to buy a house, the cost of the house depends on various factors, e.g. location in the city, presence of a backyard garden, new appliances in the kitchen. Machine learning can analyse historical data and asses an impact of each parameter on cost (defining parameters in mathematical functions). It then predicts a cost of a new house that appears in the market (output). Machine learning can also be effective recognising patterns (influence of additional parameters on output) that are not so apparent.

Figure 1 Shift in magnitude from line level to the facility or even to a supply chain level

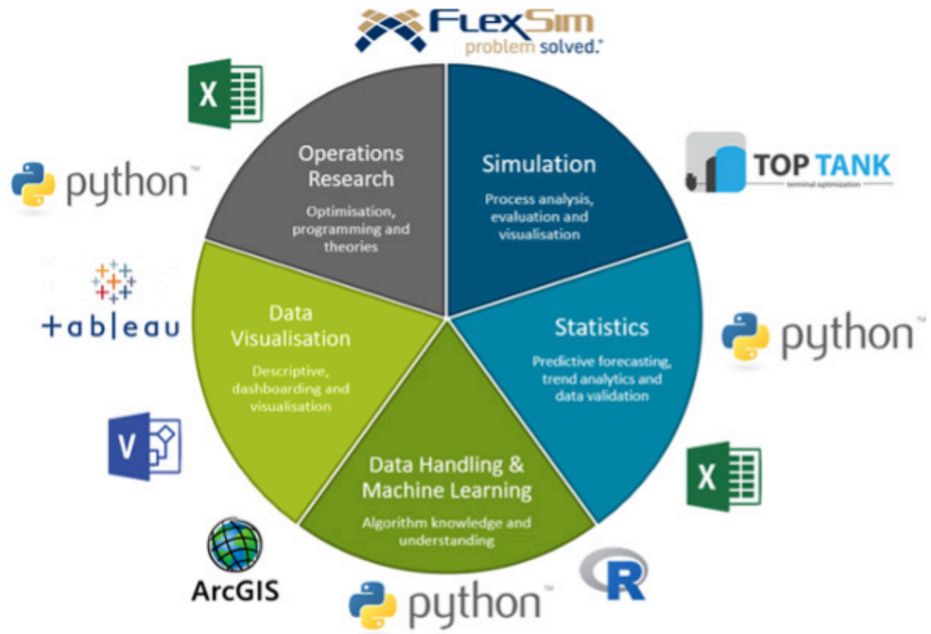


Figure 2 The various tools used by our RHDHV experts

The major disadvantage is that machine learning is not applicable if there is no big data available or if it is a completely new situation. For instance, when a plant opens a totally new product manufacture line.

In this case, predictive simulation is used. As an input it can use both big and small data, but the construction of the model requires the intelligence of a specialist with deep understanding of the technological process. The uncertainties (small data) are introduced as statistical distribution functions, e.g. arrival of truck to the plant. After carrying out calibration and validation of the model and running many iterations, the model can predict the result of each scenario with sufficient accuracy.

What approach do we use for a typical project?

The typical cycle of one of our projects is comprised of the following steps:

Step 1: Project identification

At this step, the aim is to understand the project, as well as the challenges and goals that need to be solved. We identify the scope and battery limits; we make a decision on the approach suitable to assist our client in the most effective way. Upon completion of this step, we usually compile our commercial proposal for a client. After winning a proposal, we move forward to a Step 2.

Step 2: Project Definition & Data Collection

This step is used to understand and align our understanding of the current situation, logistic requirements, challenges and goals of the study. We collect the available information; we consider phasing, different scenarios and alternatives. We define product flows and expected operations and verify with the KPIs defined by the client. During this step, we can arrange a kick-off meeting with the client to verify our understanding.

Step 3: Analysis

After data is collected, it is carefully analysed. Here, we take into account more detailed influential data, seasonality, peak factors, operating philosophy, workable hours, etc. During this step we set up a Basis of Design (BoD).

Step 4-6: Model creation, Experimenting & Post-processing

From the Basis of Design, we first build a simulation model. The model building phase is an iterative process, in which parameters are changed to tweak the model until it represents the logistic situation. After receiving the results and analysing them, we can understand which parameters are crucial, and which additional logic should be implemented in the model. The results are discussed via open dialogue with a client. If needed, the BoD is updated and the model is adjusted. The iteration is repeated until the model is validated. We carry out experimenting steps to test different scenarios discussed with the client beforehand.

Figure 3 shows a 3D visualisation of the model in FlexSim simulation software and a custom-built dashboard example to view results as a summary of the key insights.

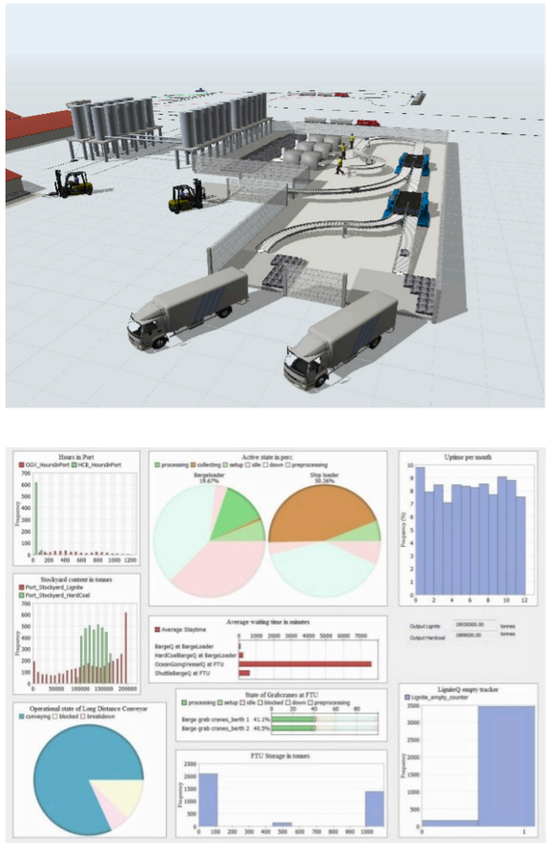


Figure 3 FlexSim - visualisation, analytics and dashboarding.

What are the example projects we did?

To get inspiration from our work, an overview of the studies performed by RHDHV is illustrated in Figure 4. It includes storage facilities, distribution networks, vessel channels, factories and warehouses.

What current opportunities do we have for students?

At the moment, we have an opportunity for an internship. This internship is aligned to RHDHV's strive for a digital way of working and implementing new technologies to improve our approach for dry bulk handling projects. The project aims to develop a parametric digital tool to design and visualise a dry bulk terminal during the conceptual design stage of a project. The intended use for this tool is the selecting and sizing the intake and outtake equipment, as well as storage facilities and optimising the design. At the end, we will verify the tool with the design of an existing dry bulk terminal.

We are looking for a student who has:

- High grades during the last 2 years
- Good programming skills in Python and data analysis
- Understanding of dry bulk handling
- Excellent analytical capabilities, independent and pragmatic
- Strong communication skills, good command of English
- Knowledge or willingness to learn Grasshopper 3D

Are you interested in what we can do for your business or would you like to join us?

Johan Pruisken - Director Advisory Group
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Frank Stoop – Associate Director Resources Logistics & Power (Rotterdam, NL)
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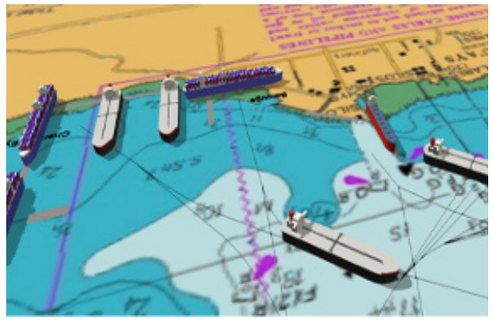
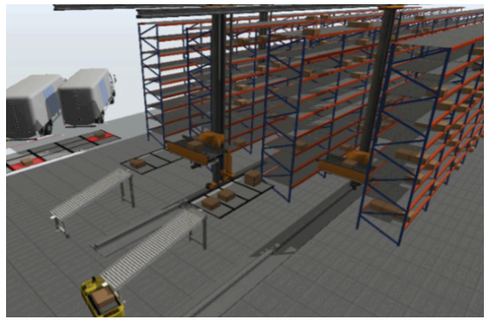
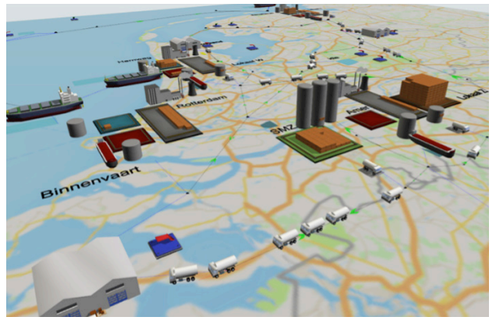
www.royalhaskoningdhv.com/en-gb/services/bulk-materials-handling/7327







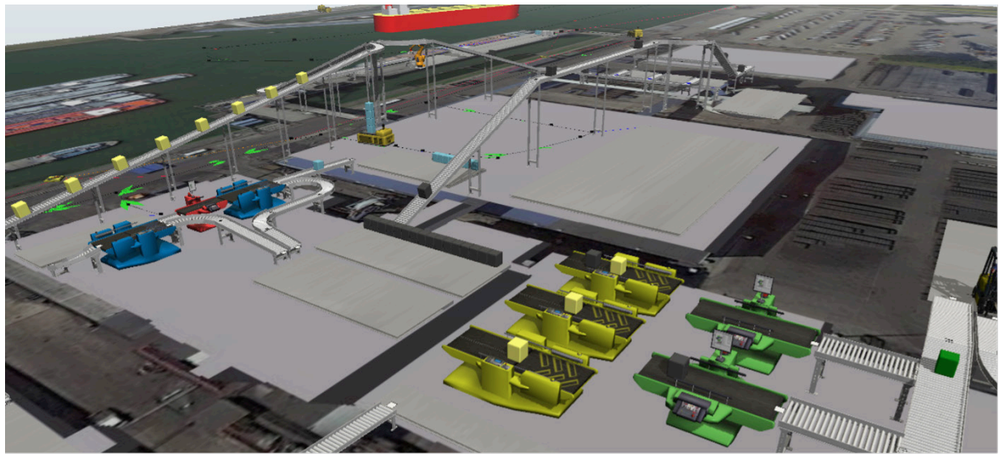


Figure 5 Our project experience portfolio

WORD FINDER

Name: _____

Supply Chain Week

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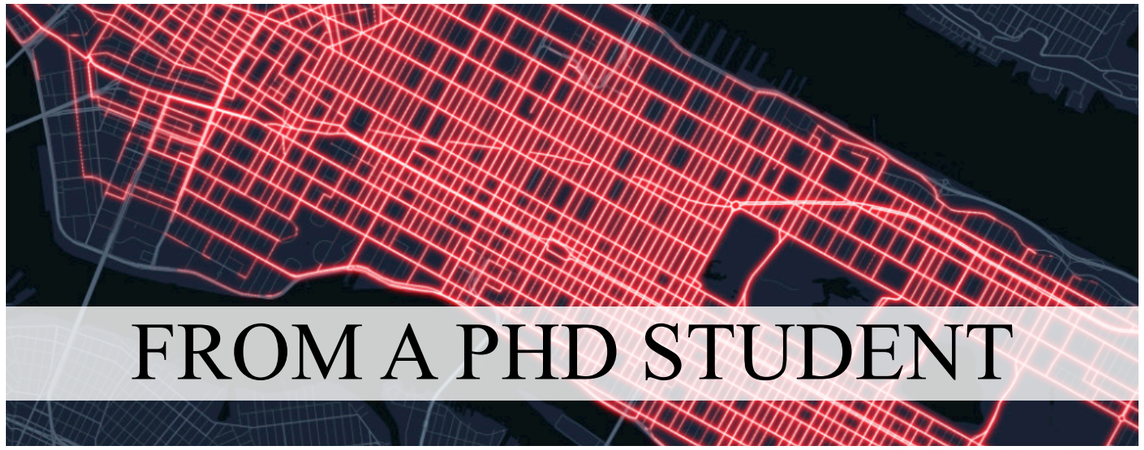
Container Contract Cost Customer Dedicated Delivery Distribution Economy
Expedited Forwarding Freight Inventory Invoice Logistics Operations Organization
Planning Proactive Procurement Product Purchasing Quantity Relationship Service
Strategy Supplier Team Timely Truckload Warehouse

See page 31 for the solution

RMINAL BURCHARDKAI
HHLA
Hapag-Lloyd
HOUSTON EXPRESS
HAMBURG



FROM A PHD STUDENT

By: Breno Alves Beirigo

I am Breno Alves Beirigo, a postdoctoral researcher and recent Ph.D. graduate from the Transport Engineering and Logistics section of the Maritime and Transport Technology department at TU Delft. Previously, I have pursued both a BSc and MSc degree in Computer Science at the Federal University of Viçosa, Brazil.

My doctoral research was part of the "Dynamic Fleet Management" module of the NWO Integrated Cooperative Automated Vehicle (**I-CAVE**) project, a multi-disciplinary and cross-university joint effort covering all research fields related to the development and deployment of autonomous vehicles (AVs). In the last years, AVs have been heralded as the key to unlock a shared mobility future where transportation is more efficient, convenient, and cheaper. Such an AV utopia, however, can only come to fruition if most users trust that autonomous mobility-on-demand (AMoD) systems are on par with owning a vehicle in terms of service quality. Due to supply and demand imbalances, current ridesharing users invariably experience delays, price surges, and rejections. Traditional approaches often fail to respond to demand fluctuations adequately since service levels are, to some extent, bounded by fleet size. In light of these shortcomings, my research with Prof. Rudy Negenborn and Asst. Prof. Frederik Schulte aims at addressing fleet performance from a more user-centric perspective, combining optimization and machine learning to meet user preferences while leveraging the unique features of AMoD systems.

My thesis entitled **"Dynamic Fleet Management for Autonomous Vehicles: Learning- and Optimization-Based Strategies"** presents a series of strategies to guaranteeing service quality in a series of operational scenarios arising throughout the timeline of AV technology deployment. To deal with the transition phase towards full automation, where the infrastructure is partially ready to accommodate automated operations, we propose optimization models for operators managing autonomous and non-autonomous vehicles in a heterogeneous network. To guarantee there is always a ride for everyone, we develop an anticipatory hiring approach that increases fleet size on short notice by harnessing the stochasticity related to the distribution of requests and the availability of privately-owned AVs. In order to contend with the service bias towards certain regions (e.g., densely populated areas, city centers, wealthy neighborhoods) learned from the mobility-on-demand data, we present a method that maximizes equity, steering the fleet to targeted areas to improve the service level of disadvantaged populations. Finally, to make the most of expensive AV technology, we model a people and freight integrated transportation system, where passenger and parcel demands are handled interchangeably by a fleet of compartmentalized AVs.

In my current postdoctoral research, I am collaborating with Asst. Prof. Bilge Atasoy and Assoc. Prof. Javier Alonso-Mora on the NWO project: Transportation and Logistics Over Water (TRiLOGy). This project aims at improving city livability by efficiently using urban waterways for mobility and logistics applications. My research is mainly concerned with designing optimization models that can leverage stochasticity in the demand and network conditions to route and schedule hybrid (over water and land) fleets of (autonomous) vehicles. Currently, I am actively involved in developing realistic use cases with our industry partners to demonstrate the benefits of taking traffic off the streets to water. For example, with our partner **Flying Fish**, the operator of **Water Taxi Rotterdam**, we investigate how routing could be improved through anticipatory-optimization methods and how adopting automated technologies could impact the service experience. Also, we are working closely with Amsterdam Municipality to design dynamic stochastic algorithms for managing fleets of autonomous vessels to (partially) carry out the city's day-to-day logistics services, such as waste collection and freight delivery.

Throughout the past five years, it has been a great pleasure to develop my work at the M&TT. The transportation field, in particular, allows for a wealth of exciting research from different perspectives (e.g., methodological, policymaking), providing many opportunities to explore innovative solutions to real-world problems. Hence, I would like to take this opportunity to encourage students who plan to work in this area to contact me (**B.AlvesBeirigo@tudelft.nl**) or the project head, Dr. Bilge Atasoy (**B.Atasoy@tudelft.nl**), to develop their work within TRiLOGy. We have a range of topics on the combination of water and land transportation for both mobility and logistics applications using learning- and optimization-based methods that could be investigated in the context of graduation projects and literature and research assignments. •

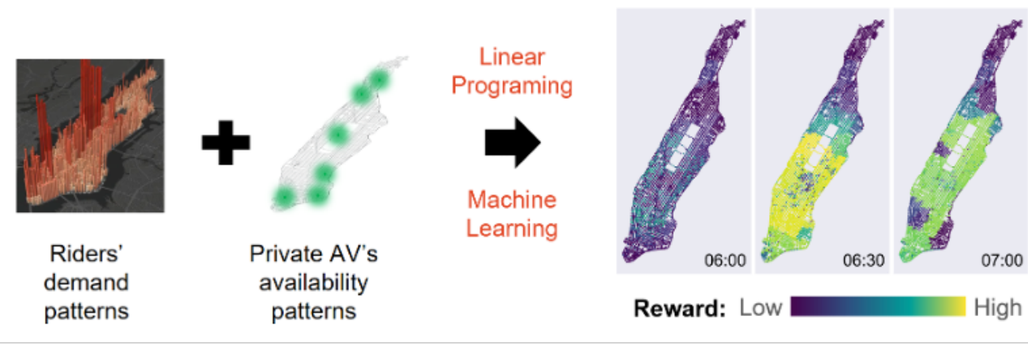


Figure: Through machine learning, the daily patterns of riders' demand and idle independent-owned autonomous vehicles are processed to approximate the end reward of positioning vehicles at each location throughout time. With these rewards, the system can measure the impact of current decisions (e.g., dropping off a user at the corner of the city) in the future.

INTRODUCING: BTC

Every year a group of 3/4 enthusiastic students organizes a Business Tour to a foreign country. The goal of this tour is to broaden the knowledge of the students by becoming acquainted with different corporate cultures. The skills that the students are taught at the Delft University of Technology are very extensive, but focused on the common European industry. A combination of the skills learned at the TU Delft and the experience gained in the corporate world can create a course for our students that grants a more improved and innovative way of thinking and solving. This could be beneficial for the students as well as for the business world, that will welcome these students within a couple of years.

During this trip the students will visit companies to attend presentations, tours and cases. Besides that, attention is paid to the cultural and social activities to create a well suited combination of professionalism and relaxation. Overall it can be concluded that the Business Tour is an essential part of the development of the students of the master Mechanical Engineering, track Multi-Machine Engineering.

Hi everyone, my name is Daan van der Wielen and I am the chairman of this year's **Business Tour Committee**. I started the master MME last september because I am interested in the design, integration and optimization of multi machine systems.

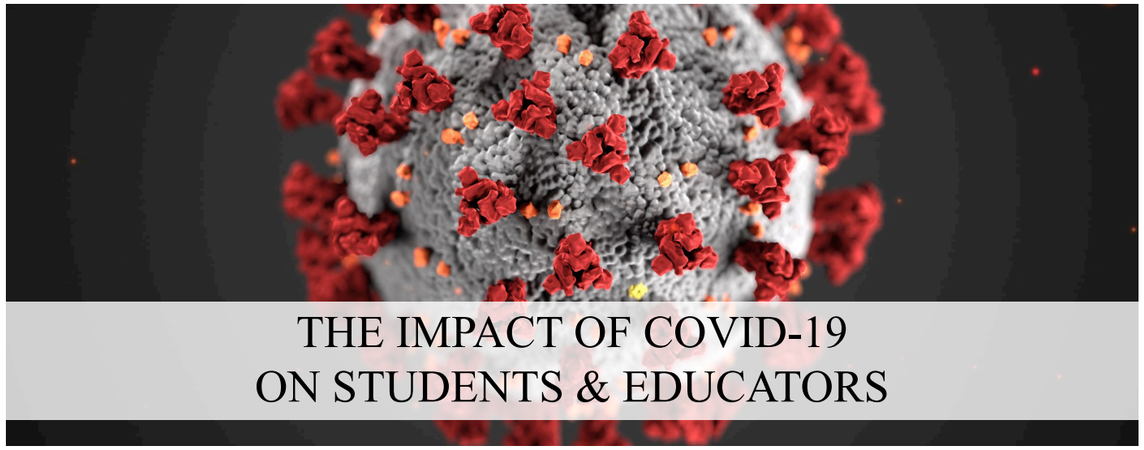
In my spare time I like doing sports: running, playing soccer, snowboarding and going to the gym. I also like to go out for drinks with friends, which is hopefully possible again any time soon.

I joined the committee because I liked the concept of the business tour and it is a nice opportunity to get to know your fellow students. Also, it is a good opportunity to focus on other things than study during this pandemic. Even though there are many uncertainties this year, we are aiming to organise an unforgettable experience for everyone attending the trip this year.

Hi, my name is Marloes Middelweerd. I moved to Delft in 2016 to start my bachelor Mechanical Engineering at the TU Delft. After my bachelor I started the master Mechanical Engineering with the track Multi-machine engineering. This year I have the honour to be the secretary of the Business Tour Committee. Together with Daan and Stijn I hope to organise a tour as unforgettable as in the previous years. The exotic country that we are going to visit this year is Spain. We will visit Barcelona and the diverse economy that the city has to offer. The tour will be a combination of visiting different companies, such as transport and logistic companies, going to the beach, enjoying the good weather and visiting cultural highlights with fellow students! Because it is slightly different this year to organise a tour for a large group of TU students who want to visit companies abroad, we are looking for opportunities and do our best to look for options to maximise the chance to continue the journey with respect to all the measurements. Hopefully we see you in the first week of the TU Delft summer holiday in Spain with the Business Tour!

Hello, I am Stijn and this year I am the treasurer of the Business Tour Committee. I started this year with the master Multi-Machine Engineering. In my free time, I like to play football and to cycle. I joined the BTC because I really enjoy being in contact with companies in the business and look at the more financial aspect of such a tour. We really hope this year's business tour will take place with the whole Covid-19 situation.

If you are interested in the Business Tour 2021 or in a collaboration with the organization and Dispute Transportkunde Pandora, please contact us at **transport-businesstour-3me@tudelft.nl.** •

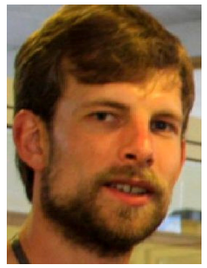


THE IMPACT OF COVID-19 ON STUDENTS & EDUCATORS

In March 2020, the coronavirus pandemic struck the world. During the past year, numerous degrees of restriction had to be made in order to stop the spread of COVID-19 all over the Netherlands. For this reason, schools and universities like the TU Delft had to shut their doors for all students and educators. This led to an abrupt move to online platforms and distance education and this sudden change had major impacts on the mental health of all involved. It brought (and still brings) many challenges to everyone's personal life and for some students and professors the transition in the educational system had a large impact.

How did the coronavirus influence the lives of a Dutch student and an international student studying Multi-Machine Engineering? How was it for an assistant professor to adapt to these changes working at the department of Maritime Transport Technology (MTT) at the TU Delft? Sanne Middelkoop, Kangjie Wu and Frederik Schulte introduce themselves and give us some insight in the struggles or enlightenments of studying and working in Delft during the corona pandemic.

THE IMPACT OF COVID-19 ON EDUCATORS



My name is Frederik Schulte. I am an assistant professor at the department of Maritime Transport Technology (MTT) since 2018. I came to TU Delft one year earlier for a Postdoc position on fleet management of autonomous vehicles, just after I had finished my PhD in Transportation and Operations Research at Hamburg University. My research focuses on problems of collaborative operations (shared mobility, collaborative transportation, human-robot collaboration) and optimization and machine learning methods. In teaching, I'm responsible for a course on system analysis and simulation, and have just introduced a new course on machine learning in transport and multi-machine systems.

When I received the opportunity to become an assistant professor at MTT, the decision to stay wasn't hard. For me, there were plenty of arguments to stay. The job of an assistant professor lets me explore my creative freedom in research and inspire and help people grow in teaching and supervision—two activities I find greatly fulfilling. I also had met excellent conditions for research at TU Delft, and of course great colleagues and students at the department. Finally, I had already gotten to appreciate the down-to-earth mentality and concepts like 'bespreekbaarheid' in The Netherlands, and the prospect to regularly catch some waves in Scheveningen was also tempting.

When COVID-19 pandemic hit last year, it hit quite abruptly. At the department, we had just had a large gathering with a nice walk-by buffet before far-reaching restrictions were introduced and education went remote. I had three days to turn my lecture into a webinar but things generally went much more smoothly than expected. It seemed like all of a sudden everybody knew how to have online meetings with all sorts of different tools. After a few months, my students seem to have become "Zoom-natives," and it's great for me to see how 25 student groups easily present 25 different presentations in one session, while seamlessly switching the shared screens. On the other hand, digital sessions can easily become quite transactional if we don't take good care to find creative ways to stimulate interaction and fun elements in class. I also think it's important to keep in mind that "everybody's coping in some way at the moment" as a colleague of mine recently put it. I try to remind myself of that, particularly in my interaction with students during supervision or classes. Some of my students have gotten ill and needed quite some time to recover and others were worried about older family members. Almost everybody seems to struggle with finding the balance in life while the lockdown restricts many balancing activities. This situation and digital communication, make it extra-important to communicate carefully and try to really understand what's going on on the other side of the Internet connection.

These complications should, however, not darken the outlook on the future. When I look at my MSc. students, I don't think they need to worry about their career opportunities. Companies are still looking for talents and creating new jobs. The difficulty that I have rather sometimes seen is that students get a little stuck under the current conditions and don't actively reach out for opportunities. In this case, I think it's very important that they talk to people (their supervisors or others) and seek support.

To finish with some positive aspects, cheap digital conference fees have allowed me to attend much more international conferences than I had imagined, and collaboration with colleagues in California, Chile, or China has become as easy as working with the Dutch colleagues. I have also become much better and more efficient at cooking. ☺ Nonetheless, with KLM we had some research exchange about the vaccine distribution and I really hope the vaccines may give us back our campus lives soon! •

THE IMPACT OF COVID-19 ON STUDENTS

I am Kangjie Wu, a Chinese student who loves singing, hosting, cooking and travelling. In August of 2020 I came to The Netherlands for the first time and I felt very excited about my coming master's study. At that time I could not imagine how difficult, but wonderful this journey would be.

Before I came to The Netherlands, many challenges started to break into my life. Due to the corona the consulates were closed and all visa-related matters had to be delayed. It was not until mid-July that I received the result of my visa appointment, which would have finished much earlier in the previous years. At the same time the number of international flights drastically reduced and some flights were cancelled before departure. I kept following information and communicating with my friends. Finally, in mid-August, after a 14-hour flight, The Netherlands said good morning to me.

The reason why I spent so much effort to come to the other side of the earth is to pursue my dream. My undergraduate background is Mechatronic Engineering and I find my area of interest is logistics after some explorations, so I do hope to combine these two in my higher education. The relevant courses offered by the MME track match my preferences and I knew that the Netherlands, a country with high internationalization, is truly a leading force in logistics, so I chose MME in TU Delft without any hesitation.

Unfortunately, because of the corona online education has been the main measurement taken by every university, which is not the same as my ideal study abroad life. Network connection errors, limited guidance for using school resources and lack of offline experience, many factors have become the barriers on the way of learning. On the other hand, corona has limited the chance for future careers, like the decrease of the chances of seminars, internships

Despite the difficulties, there are some positive things that I found in life to fight against the corona. For example, as it never snows in my hometown, I could not explain how excited I was upon seeing the first snow in my life and went out to play in the snow with friends. Meanwhile, I spent my Christmas and Chinese Spring Festival abroad for the first time. These were both brand-new experiences for me. During that period I found a chance to host the Chinese Lunar Year Gala at the Chinese embassy in the Netherlands, which was precious sunshine in that hard time.

Apart from this, corona has made me spend more time with myself in my studio and my cooking has become better, because I like to use food to decorate my life when it is dull. Here are some dishes I made by myself. If they make your mouth water, my door will be open for everyone after the epidemic policy gets looser.

At present, life is struggling. However, when life gives you a hundred reasons to cry, show life that you have a thousand reasons to smile. Let us fight together as one with the corona and I am looking forward to seeing your smiles on campus again and do not forget to give me a hug.

My name is Sanne Middelkoop. In September I started with the master Multi-Machine Engineering. Last year I took a gap year, in which I was the chief Vehicle Dynamics at Eco-Runner Team Delft, a dreamteam of the TU Delft.

I am 23 years old and I have lived for most of my student life in Delft. Right now, I don't have housemates. In my spare time, I like to do gymnastics. I am a member of the student gymnastics association in Delft and I am a gymnastics teacher at my old association. Normally, the time I have left I mostly spend with friends.

For my bachelor, I studied Clinical Technology. This bachelor is a collaboration of the TU Delft, Leiden University and Erasmus University. The education that is given by the TU Delft is at the same faculty as Mechanical Engineering. The bachelor was not as I had expected it to be and because I was often at 3mE, I got quite some insight in the Mechanical Engineering bachelor. This made me enthusiastic to look into different masters and I decided to do a pre-master, with the goal to do the Biomechanical Design track after finishing, this still being somewhat close to the field of my bachelor.

During my pre-master and dreamteam year, I found out that I was more interested in the Multi-Machine Engineering track and that I didn't miss the human subject. Luckily, that was possible with the same pre-master, so I decided to do this.

Because of the switch I made, I didn't know anyone that started this master at the same time as I did. With all this online studying it is hard to get to know people. Luckily, in September it was still possible for Pandora to organize an introduction day. During this day, it was possible to get to know at least some people of our master track. There I met some people that I still speak to on an almost daily basis and do a lot of the group projects with. Most of the groups for projects are now formed online, by asking in the WhatsApp group for the master track. This means that we often have no idea who they are until the first online meeting. Of course, the projects are all done by online meetings. This doesn't have the same feeling and especially in larger groups it is also somewhat impractical, but we can still get the projects done. To prevent that I'm studying on my own for the whole week, I usually study a few times a week with a friend. Even though we are working on our own things, it motivates to keep studying and gives the feeling of studying at the TU with friends. I'm confident we still learn all we have to know to become an engineer, but I'm looking forward to finishing my masters offline again. •

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JOINT INTERDISCIPLINARY PROJECT

By: Franco Bui Duc

Hi there, my name is Franco, 2nd year master student of MME (former TEL). I did my bachelor Mechanical Engineering here in Delft as well and I'm currently working on my graduation project. In Q1 of the second year of my masters I've had the option to start the research project, do an internship or do the Joint Interdisciplinary Project (JIP). Because I wanted to have more experience working with a company, I've had in mind to do both JIP and my graduation project with a company, which was the only way to do it for our MME track of 2020-2021. What I didn't know back then, is that JIP was going to be one of my best project experiences I've had in my time as a student here in Delft. In this little story I will tell you all you need to know about JIP and also my experiences.

What is JIP again?

The Joint Interdisciplinary Project is a 10 week program where you can work with students from different faculties on a business case provided by a company or organization. These cases are often real challenges the company is facing with a focus on innovation and adding value to the company or society. The 10 weeks minus 1 week of kick off sounds short but I was really surprised how much we managed to do in these weeks. Also included in this 10 weeks are the studytrips, which unfortunately didn't happen in times of Corona, the midterm where you will present your progress and the final presentation, where you will be burned to the ground with questions by external professionals from the TU Delft. Together with your company coach you will experience a project like you never experienced before during your bachelor (or masters). Another great thing about JIP are the strict deadlines so you know you will be finished with your first step of your last year after these 10 weeks.

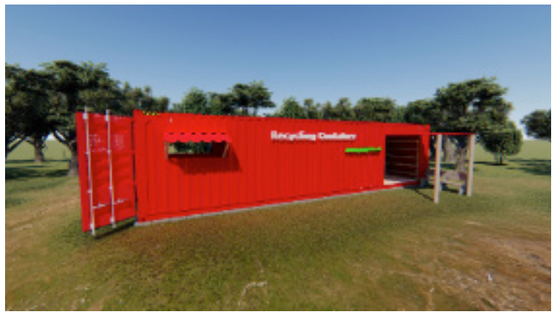
How it started

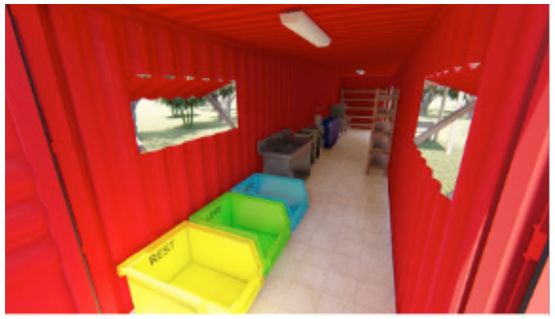
I didn't have that much expectation joining this project, but looking at the different cases, it was hard for me to select my top 5. There were a lot of great cases related to transport engineering or logistics! (Un)fortunately for me I was assigned to a case from an aerospace company Embraer about "encouraging social mobility to improve the quality of life in Ulundi, South Africa". This case was broad and vague but I saw something about a transport and mobility aspect in a developing country which triggered my interest. Initially thinking about designing a transport system or vehicle that can add value to the people in South Africa, ended up in a plan to set up a local plastic recycling facility in a 40 ft container and a prototype of a plastic sand brick. Yes, I baked a brick in my final year as a student in Mechanical Engineering.

The process

So how did we get to this point? Let's start from the beginning, where we met up online as a team during the summer to meet each other and our supervisor. It was pretty clear from the first meetings with our company coach and first stakeholders in Germany and South Africa that instead of technical innovation, this project would be more focussed on the social aspect and to solve a local problem in a city Ulundi in South Africa. The scope was limited to the city Ulundi, where people have more essential things to worry about instead of high technology. By adding the input from local stakeholders and by using our project management and design tools, we eventually came to plastic bricks for construction as a plastic recycling solution. Defending our project was definitely our greatest challenge, but by knowing this, we could also prepare for it. Unlike other cases, there was zero connection with our company Embraer and unfortunately for us there is nothing we could gain from their knowledge and technology. Our company coach has a great network of stakeholders all over the world and wanted to do more projects regarding sustainability and local movements instead of R&T from Embraer. This network of stakeholders was definitely valuable for us and our project.

Because of our non-technical innovative topic, there were a lot of confused faces from students and JIP coordinators during the presentations with the other groups. But since we had a great team, we still really enjoyed these moments. The JIP coordinators and student assistants also started to notice this and we quickly became one of the favorites. Teamwork definitely was an essential part of the success of this project.





Teamwork

I worked in a team of mostly international students from Industrial Design Engineering (IDE), Civil Engineering (CE), Sustainable Energy Technology (SET), Technology, Policy and Management (TPM). From the beginning we've had a great time together and we knew we could work well together. I was quite overwhelmed by how intelligent everyone was, but I quickly realized that we are all from a different background and how much they don't know about things I've learned from my studies. I was the Mechanical Engineering expert of the group and together with the CE and SET students we were the "thinkers". The "project managers" are the students from IDE and TPM that could use their tools to lead this project at the beginning. Most of our meetings were online due to Corona, but luckily we also had our hours at the university where we were the most productive. From Mondays till Fridays we were working from 8 till at least 5 but with great teamwork, it's easy and fun to work for a long period of time.

What's in it for me?

JIP was such a great experience and not many people could say they baked a brick in the final year of their mechanical engineering master. During JIP I've learned a lot about my strengths and weaknesses especially compared to other disciplines. I saw areas such as presenting and reporting in which I could improve during the feedback sessions and I took my opportunity to do this during JIP. I've also learned a lot of project management tools from my team members from IDE and TPM that I'm currently applying in my graduation project. Overall I see JIP as one of the perfect stepping stones towards my graduation project and beyond.

What now?

In these 10 weeks we went from nothing to a detailed plan to improve the quality of life in Ulundi, South Africa. Something none of us could ever had imagined. Because we realized we are basically a startup, we started to look around for funding for the implementation of this project starting with the Ambitious Idea Grant from FAST, TU Delft. After several forms, emails and meetings with Fast, we were selected to pitch our idea online for 10+ people including people from Fast and some professors/professionals. It was super short and a bit chaotic so after this crazy experience it was a little surprise to hear that we actually won this grant. This was a great motivation to continue working on this project alongside our graduation project and internship. And because our plan is ready for implementation, there is not much to do besides waiting, maintaining our local connections and detailing our plan before we can travel to South Africa hopefully at the end of the summer. •

WORD FINDER SOLUTION

Name: _____

Supply Chain Week

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O H N J P F E N G E R Y M Y W D R U O G A N G Q
B Z Y G W C R X V V A D G P R O D U C T R G Z E
H E U X A U T I P L X E S K W O M J F Y L H O D
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D I S T R I B U T I O N M Q U A N T I T Y G T X
D O T D X C R G Q W A R E H O U S E V A B P B U
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Container Contract Cost Customer Dedicated Delivery Distribution Economy
Expedited Forwarding Freight Inventory Invoice Logistics Operations Organization
Planning Proactive Procurement Product Purchasing Quantity Relationship Service
Strategy Supplier Team Timely Truckload Warehouse

We hope you enjoyed reading this edition of the NetwerkNieuws. To make sure that everybody has their preferred reading experience, we are in the process of fine-tuning our readers' NetwerkNieuws preferences. Do you no longer want to receive the NetwerkNieuws? Would you rather receive the magazine digitally? Or would you like to communicate a change of address? You can send an email to our secretary Koen at **info@transportkunde.nl**. You can also consider registering for the new alumniportal of Delft University of Technology, TU Delft for Life, at **www.tudelftforlife.nl**. Here you can change your address and you can receive updates on events and the latest information for alumni.

We look forward to sending you our next edition of NetwerkNieuws in the fall.

Dispuut Transportkunde Pandora board 2020-2021,

Gitte, Koen, Bastijn, Laurens & Carolina