

# SWELL

November 2019 Volume 41 Number 1

HET WATERBOUWDISPUUT



Hydraulic Engineering Student Association



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# FROM THE EDITORS

Dear members,

After returning from the MEX this weekend, we could finally finished our big surprise for you. Last period we moved to another room, but we finally moved back to 3.72. And because you had to miss the hydraulic coffees during the period of moving, we created this magazine for you.

In this Swell contains everything you ever wanted. For example the introduction of the board of 'Het Waterbouwdispuut'. You can also read a review of the past study tour to Brazil, and many more past events.

We hope you have as much fun reading this Swell, as we had by creating it!

The editors,

Murielle van Pampus  
Ferdinand Holzhaus  
Eva Houbiers

PS: The coffee is back every Tuesday!



The editors: Murielle, Ferdi and Eva

# PAST EVENTS

## SEPTEMBER

- 2 Sep Master kickoff
- 22-29 Sep Course Fieldworks
- 26 Sep Hydraulic Drinks

## OKTOBER

- 3 okt Waterbouwdag
- 22 okt Last Hydraulic Coffee



## NOVEMBER

- 7 Nov Hydraulic Drinks
- 21-24 Nov MEX Goteborg



# UPCOMING EVENTS

## DECEMBER

- |               |                                   |
|---------------|-----------------------------------|
| <b>3 Dec</b>  | Hydraulic Coffee is back          |
| <b>9 Dec</b>  | Lunch lecture Horvat              |
| <b>12 Dec</b> | Hydraulic dinner                  |
| <b>16 Dec</b> | Lunch lecture Royal Haskoning DHV |

## JANUARI - FEBRUARI

- |                  |                                |
|------------------|--------------------------------|
| <b>21 -5 Jan</b> | Christmas break                |
| <b>30 Jan</b>    | Hydraulic Drinks               |
| <b>20 Feb</b>    | Company case Witteveen + Bosch |

## SUMMER 2019

## STUDY TRIP 18 JULI - 1 AUG



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Greystones Marina, Ireland © Peter Barrow



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Are you fluent in English and Dutch and have a passion for hydraulic engineering? We would like to hear from you.

[yvonne.dunphy@arup.com](mailto:yvonne.dunphy@arup.com)

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# ARUP

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# FROM THE PRESIDENT

Dear Hydraulic friends,

With the first Master exams already behind us there is no denying it, the academic year of 2019/2020 is already in full swing. This means a new year with more hydraulic coffees, more hydraulic drinks and of course a new board for the Hydraulic Engineering Student Association. This means the former board can finally enjoy their well-deserved time off and focus on finishing their Masters. For their input, enthusiasm and hard work throughout the past year, I would like to thank the board of 2018/2019, consisting of Marijn, Gabriëlle, Pauline, Jakob, Jim, Bart and Roline. You have taken an extra step in matters of professionalisation and transfer to us a thriving and flourishing association with a worldwide reach.



As already mentioned, with the depart of the former board, this summer seven new master students were introduced to the wonders of 'het Waterbouwdispuut'. As the new chairman of the Hydraulic Engineering Student Association, I proudly present the board of 2019/2020!

## DIRK JAN MICHELS

### CHAIRMAN

Hi there! I'm Dirk-jan, a 24 years old Hydraulic Engineering "rookie". I achieved my Bachelor degree at the faculty of TPM, but felt like a fish out of water, so the past two years I followed my heart and a challenging premaster to the master Hydraulic Engineering. During this year I am the chairman of 'Het Waterbouwdispuut', which means I'm responsible for informing you with the latest news via speech and mail. However if you ever have a question don't hesitate to ask me right away. Besides that it is my task to make sure that also this year all the Hydraulic events will be a great success! I know this task will be a challenging one, but I'm sure I will find a way to manage. As I always like to say:



"You can't stop the waves, but you can learn how to surf "



## EVA HOUBIERS

### SECRETARY

Hi Hydraulic Friends, after my bachelor in Mechanical Engineering I was looking for the right master direction. I followed my interested and love for water to the master Hydraulic Engineering. Water is something that connects us all, I like to enjoy the waters during swimming, sailing or skiing. Next to also studying water I will be the Secretary of 'het Waterbouwdispuut'. During this year I will be responsible of keeping you as students up to date about all our activities and events. There will be a lot of them during this year hosted by us or companies. The perfect opportunity to meet your fellow students, the department, the professors and companies. To follow all the events become a member, check the website and follow our social media channels. And we are always interested in hearing your ideas on interesting events, let us know and come by at the hydraulic coffee or room 3.72!

## FERDINAND HOLZHAUS

### TREASURER

Dear hydraulic friends,

My name is Ferdinand, and I'm 24 years old. I started my bachelor in civil engineering in the year 2015 and last September I started my master Hydraulic engineering. During this year I'll be the treasurer of the Hydraulic Engineering Student Association. If all goes well, you will not hear a lot from my side, in the other case I will be on the other side of the world on the beach watching the waves. Despite that I'm always open for questions so don't hesitate and come by our room, or tackle me somewhere during the lectures!



## MURIELLE VAN PAMPUS

### EDUCATIONAL AFFAIRS

Hi everyone, my name is Murielle and I'm 23 years old. After finished my bachelor Civil Engineering, I started my master Hydraulic Engineering last september. Which was not a surprise for many, with my lifelong love for sailing, surfing and swimming.

This year I will be the Educational Affairs of 'het Waterbouwdispuut'. So if you have any compliments, complaints or issues with a course, do not hesitate to let me know. I'm really looking forward to the upcoming year and am enjoying it so far. I hope to see you at our hydraulic coffees, drinks or other activities.

# JAN VAN OVEREEM

## INTERNAL AFFAIRS

Hello everybody! I'm Jan and this year I will be responsible for all internal affairs of 'Het Waterbouwdispuut'. Few years ago I started my bachelor civil engineering in Delft and after the first lectures about water and hydraulic engineering I was already fascinated with this field of work. Last year, after an amazing trip to Brazil, I got to know 'Het Waterbouwdispuut', and from that moment on, I knew: I want to be the internal affairs of this board. And so I did. With this function come two amazing activities I will organize for all hydraulic engineering students: the MEX (which will go to Gothenburg this year) and the Symposium. Looking forward to this year and everything I'm going to learn from it!!



# DAAN SLAGMOOLEN

## EXTERNAL AFFAIRS

Once I was a little kid watching the tv together with my little brother when suddenly a lost hero appeared on the screen, drinking a simple glass of milk. This wise man than told a cow: 'I just said so, no bommetje!'. From that moment on it was clear to me. I wanted to be a hydraulic engineer so that I could become part of Het Waterbouwdispuut. Now, almost 18 years later, I'm sitting in office 2.73 thinking about how to translate Het Waterbouwdispuut to English. Besides this day-job, it is also my responsibility to contact all 17 of our proud to be called partners and organize various amazing activities with them for you. When you are interested in an internship, Master thesis subject or you just want some information regarding one of our partners, you can always pass by at our office or sent me a message. If I'm not at the office, I will probably be on the other side of the world on the beach watching the waves. Not with Ferdinand though, but with an ice-cold caipirinha.

# SIEF ANDRIOPOULOS

## FOREIGN AFFAIRS

Hydrauliska teknikvänner, φίλοι υδραυλικής μηχανικής,  
hoa hoa hiko, hydraulic friends,

Our mother countries might be far from each other. What connects them most is water. The chinese say; “Water and words are easy to pour but impossible to recover”. The Albanians state; “Fire, water and government know nothing of mercy”. While there is a proverb in Lao that goes; “When the water rises, the fish eat the ants; when the water falls, the ants eat the fish”. Throughout our history and culture, water has always played a vital role in society.

Water is the reason we’re all here to study. But in in Delft we mostly focus on the Netherlands and its rich history of Hydraulic Engineering. Twice a year, the Waterbouwdispuut offers the chance to also get a taste of the other cultures and organises a trip abroad. This year, I will be responsible for those study trips. In november we will visit the lovely Swedish city of Gothenburg and in the summer on 2020 we will go on a 2-week trip to a still unknown destination outside of the EU!





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# STUDY TOUR SUMMER 2019

## BRAZIL

by Jim Tukker

Over the years 'Het Waterbouwdispuut' has had some amazing destinations for the hydraulic summer study trip. This year it was time to visit the biggest country in Latin America; Brazil. With a coastline of more than 7400 km, the biggest port of South America and the second longest river in the world, Brazil is a must visit for every Hydraulic engineer. Not only the engineering side of Brazil is very interesting, the culture, nature and diversity in population make it a worthwhile visit to never forget.



After the hydraulic academic year of '18/'19 it was time to start the summer with a bang. With Nineteen hydraulic engineering students, accompanied by Prof.dr.ir. Stefan Aarninkhof and Prof. dr.ir. Johan Winterwerp, we went to Brazil! After 18 hours in the airplane, with a small stop in Portugal to learn some Portuguese, we arrived in the beautiful city of Rio de Janeiro. The city famous for its Carnival festival, amazing beaches like Copacabana and Ipanema, and Christ the Redeemer statue. We had a warmly welcome by Han and Susana with a nice dinner before we could try and get rid of our jetlag.

The Copacabana beach was not only a popular destination for us, Boskalis liked it so much that they had their office at the boulevard of Copacabana. After some interesting lectures at





Boskalis with a beautiful view we concluded our company visit at Boskalis with a nice lunch to learn more about what is was like to work abroad and especially in Brazil. The second day we were invited to visit the Federal University of Rio de Janeiro where we had some interesting discussions about building with nature solutions for the water quality of the Guanabara bay in Rio de Janeiro. The Brazilian students were very excited to show us Rio which eventually led to an amazing night out dancing salsa till the early hours. Sadly, we had to say goodbye again to Rio and take off to Florianópolis, the capital of southern Brazil's Santa Catarina state.

Florianópolis is made up mostly by the 54km-long Santa Catarina Island, which makes it very interesting from a hydraulic point of view. Professor Antonia Klein from the Federal University of Florianópolis took us on a bus trip to see the most interesting places on the island including the migrating dunes on the north side. Apparently having lectures on top of a sand dune is much more fun than in the normal lecture rooms. All good things come to and end, just like our visit to Florianópolis. Luckily, we had a last evening to celebrate! Not only because of the delicious churrasco BBQ but because Stefan received a new project!





The program intensity was slightly increasing with a new city almost every day. After a morning sleep in the bus of six hours we arrived in Itajai. We had the opportunity to experience a day of dredging with Van Oord. After a nice lunch and safety instruction it was time to get on the Backhoe and Trailing Suction Hopper Dredger to do some dredging for the Itajai port! An amazing experience which made our hydraulic harts beat faster than ever. The moment we thought our time was up at the TSHD we were in for a nice surprise, the TSHD had already sailed far into the sea to dispose the sand which meant we could watch the beautiful sunset on board of the TSHD!

The next day we had enough time to have some rest during the ten hour to Santos, the biggest port of South America. The port authority was kind enough to welcome us in Santos and show the port. After some facts and history, it was time to see the port for ourselves. On a boat we sailed past container ships of more than 300 meter to witness the port activities from up close. We concluded the day with a visit to one of the container terminals where we witnessed the offloading of a container vessel which had just arrived from Hamburg.





The city of Sao Paulo was saved for one of our last destinations. With twelve million inhabitants and an area as large as the province of Utrecht you could say Sao Paulo is quite a large city which is not easy to forget. The first day Arcadis invited us at their office to get some insight in their civil works in Brazil with a focus on the wastewater treatment in Sao Paulo. Afterwards we had some free time to split up and explore the city. The result was that everyone went to the same rooftop bar to have the best view of Sao Paulo, I guess everybody missed each other already after a few minutes. Luckily, our trip to Sao Paulo ended with some well deserved caipirinha's.

After 8 days of visiting companies, travelling and partying it was time to relax and look back at the amazing places we visited up to now. No better to do this than in the small port city Paraty! A beautiful city perfect for a boat trip, relaxing and taking some nice pictures to show of to the people back home. After Paraty we went back to our final location; Rio de Janeiro. Here we had a cocktail party at the residence of the Dutch consulate with the TU Delft Alumni. Last but not least, the sugarloaf and Christ statue were crossed of our bucket list!



With this our study trip came to an end. A lovely two weeks full of activities in which we made beautiful memories and learned a lot about hydraulic engineering in Brazil. Although there is still a lot more to explore in Brazil, we have had a good impression of this beautiful country and its culture. A big thanks to the organization of the study trip, the professors Stefan and Han accompanying us and the companies for making this trip possible! If you are looking forward to having an experience such as this one, please do not hesitate to sign up for next years trip!



# HYDRAULIC ENGINEERING

# MASTER SPECIALIZATIONS

If you have trouble fitting in the courses in your time schedule, the site of Tjerk Zitman is very helpful. It is possible to select your specialisation and it will make the schedule for you.  
[www.tjerkzitman.nl/WS\\_2018\\_new.html](http://www.tjerkzitman.nl/WS_2018_new.html)

## **Coastal Engineering**

Prof. Stefan Aarninkhof

## **River Engineering**

Ass. Prof. Astrid Blom

## **Ports and Waterways**

Prof. Mark van Koningsveld

## **Dredging Engineering**

Prof. Cees van Rhee

## **Environmental Fluid Mechanics**

Prof. Ad Reniers and Prof. Julie Pietrzak

## **Flood Risk & Hydraulic Structures**

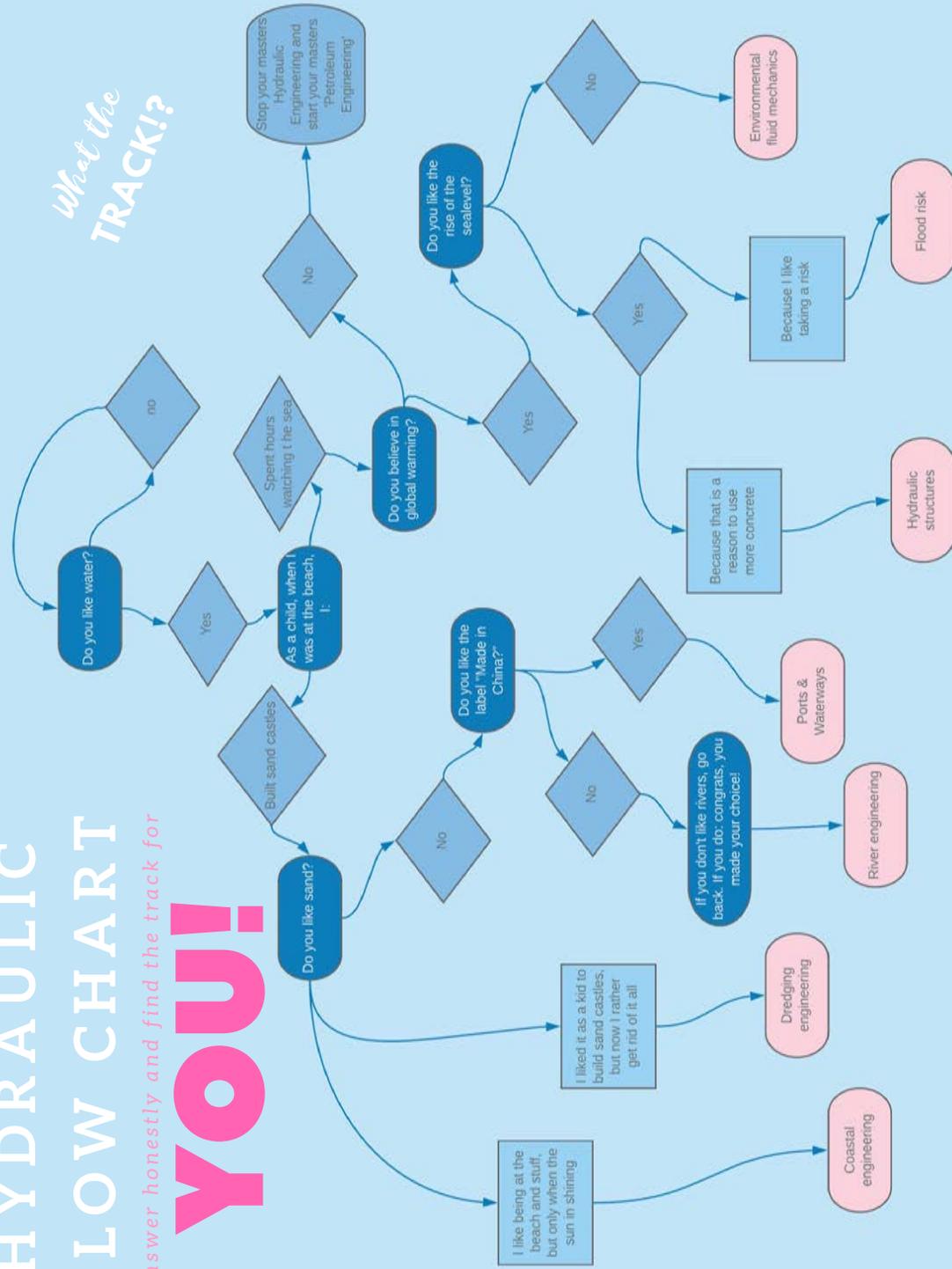
Prof Bas Jonkman & Prof Matthijs Kok

# HYDRAULIC FLOW CHART

Answer honestly and find the track for

# YOU!

What the TRACK!?



# HYDRAULIC FIELDWORKS

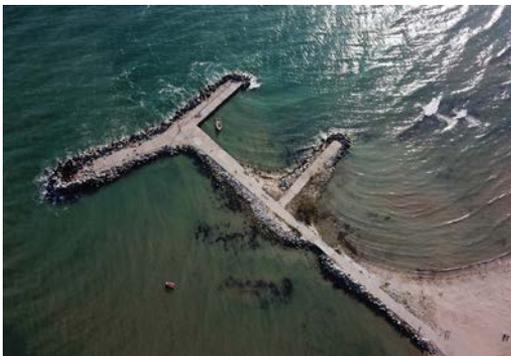
# BULGARIA

*By Nicole Hartman*



For the course Fieldwork Hydraulic Engineering a group of 16 HE-students had the opportunity to experience a part of the Hydraulic Engineering world in Bulgaria. The focus of the course is to gather data in the field by working in groups and getting an idea about the errors of these measurements. The assignment was to come up with solutions for the White Lagoon Resort regarding beach quality, water quality, marina development and winter tourism. The boundary conditions for the design were unknown and had to be measured unlike all other design assignments we get during the master program.

During this trip we learned a lot about measuring beach-, weather- and wave conditions, reporting data and working in a team. We saw multiple examples of the importance of maintenance works and the results of a lack of maintenance. We visited impressive quarries and interesting hydraulic structures. At the end of the week we presented the conceptual designs the group came up with to the hotel managers who were very enthusiastic. During the whole week we were blessed with a delightful 25+ degrees Celsius, a lot of sun, and affordable delicacies. All together it was an unforgettable experience and we thank Mark Voorendt, Boyan Savov and Boris Minkov for this opportunity and their great initiative.





# HYDRAULIC FIELDWORKS

# THE NETHERLANDS

By Tess Wegman

Dear Hydraulic friends,

In September me and 11 fellow students had the privilege to join a full week of measurements on the Sand Engine for the Dutch Hydraulic Fieldwork Course. Obviously, it was a great educational experience and an important contribution to scientific research (I hope), but most of all it was great fun to play outside at the beach for a week. The Dutch fieldwork course is led by Matthieu de Schipper, who is a passionate coastal engineer with a lot of experience in the field.

To collect wave data, pressure sensors had to be installed on poles in the water. During low tide we jettied the poles into the ground by liquifying the sand around the poles. Installing the most offshore devices on the poles were quite a challenge due to the incoming waves: it cannot get more exciting than this for (future) coastal engineers.





A less exciting activity of the week were the GPS measurements with a rod on a wheel, however it gave rise to curious trespassers. After walking a grid (of 5x5 metres) with the UFO-shaped GPS device we got some very confusing looks from beach guests. 'What the hell are you guys doing? Some sort of extreme high precision game?'

Not only random tourists were interested in our activities, on Thursday a radio reporter of the Dutch radio programme 'Vroege Vogels' came by to interview Matthieu and some students. The reporter arrived at the beach with his wetsuit so he was totally prepared for some action! This probably explains his obvious disappointment when Jasper and Chris 'installed' a pressure sensor at the bottom of the lagoon. The device was dropped to the bottom within one second, after which the reporter says 'Was this it..?!'.

Retrieving the device from 4.5 m water depth connected to a weight of 12.5 kg was less of a piece of cake. I volunteered to help Jasper on this workout. After several attempts we managed to get the valuable device with the probably more valuable data out of the water.

If you ever get the chance to do fieldwork within your masters I would definitely recommend it!  
Tess



# WATERBOUWDAG 2019

## NAAR CIRCULAIR BOUWEN IN WATER

On the 3rd of October the annual hydraulic engineering day took place, the theme was circular construction in water. Worldwide, the construction sector is responsible for one-third of the CO2 emissions. With the new climate agreements, the construction sector cannot lag behind in becoming sustainable. This day was the perfect opportunity to exchange ideas within hydraulic engineering. The day was hosted by Stefan Aarninkhof and Bas Jonkman. Also various partners of 'Het Waterbouwdispuut' such as Arcadis, Van Oord, Witteveen+Bos and many other partners were present this day.

The day consisted of different presentations, interviews and discussions about the newest developments. Worth mentioning is the presentation about The Dutch Coastline Challenge wherein the short term (2030) a fully sustainable coastal defence of the Netherlands should be achieved and the presentation about the Afsluitdijk: a sustainable pearl. The board of Het Waterbouwdispuut were present this day to help with the organisation and also to represent the students on the information market and thus to recruit any new partners. All in all it was a lovely day to be at and if you missed the day this year, don't hesitate and make sure you are there next year!





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# MSC THESIS HYDRAULIC STRUCTURES

## RUBEN FRIJNS

*Design of an adaptive weir; A case study of the replacement of weir Belfeld*

In the Netherlands, many hydraulic structures, among which the weirs in the Meuse River, approach their end of lifetime. Concrete degradation is going on and the operation of the weir does not meet the ARBO-legislation on safe labour conditions. In my thesis, the need of weir replacement is combined with the future uncertainty. This uncertainty is represented by the four Dutch delta scenarios, which consist of a unique combination of socioeconomic developments and climate change. During my research I designed an adaptive weir to replace a current weir in the Meuse River. The adaptive weir has not been designed to the worst case scenario at first instance, but can be easily adapted to each scenario.

By choosing the right location, it is possible to add a weir opening in the future next to the existing weir openings. The larger discharge capacity of the weir can be useful if the peak discharges of the river flood waves increase in future. Also, by choosing radial gates, the water level can be heightened by 1.2 m to increase the freshwater storage in summer. By designing adaptive weirs, the river area can cope with changing boundary conditions and requirements with limited investments.





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We are a young and dynamic team of engineers, supported by senior experts and specialists, providing tailor-made solutions through innovative thinking and experience from the field.

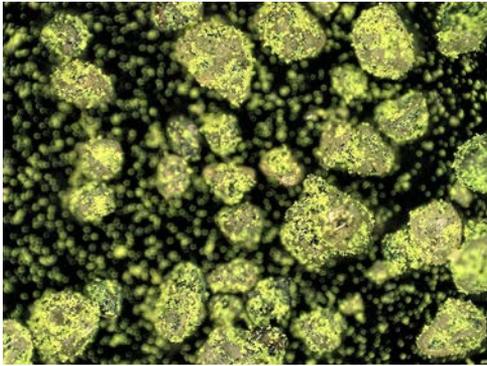
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# PHD HYDRAULIC ENGINEERING IN THE NETHERLANDS

*By Stuart Pearson*

For a long time, a PhD was the last thing on earth that I thought I'd want to do. "PhD" conjured up images of slogging away in a windowless cubicle for four years deriving new bedload transport equations. However, after finishing my master's thesis in Delft, I discovered: (1) I loved research; (2) I really liked it here and wasn't ready to go back to Canada yet; and (3) doing a PhD didn't necessarily mean falling into a bottomless pit of PDEs (though it certainly can, if you're into that). There are many different kinds of PhD project, so maybe the one for you is out there!



The Netherlands is really quite an inspiring place to do a PhD in our field. There is so much interesting research going on here, and so many of the world's foremost experts in hydraulic engineering can often be found in line for the same coffee machine as you every morning. Furthermore, the entire country is a living laboratory for hydraulic engineering. From sand engines to storm surge barriers, there is no shortage of fascinating examples of how to live in a world with rising waters.

My PhD project involves trying to understand the pathways that sediment takes as it moves around tidal inlets and estuaries. Can we use this knowledge to plan more effective nourishments around the Wadden Islands and tidal inlets to the north? To answer this question, we use a combination of field measurements, laboratory analysis, and numerical modelling. From ships in the North Sea, we deployed instruments, collected sediment samples from the seabed, and chased drifters around in the waves. The project is also very much a team effort: we work together with the Dutch government (Rijkswaterstaat), two other universities, and numerous other dredging and consultancy companies.



A PhD offers lots of freedom to follow your curiosity and try new things. This means that you really need to be your own boss and manage your time effectively. If you're thinking about a PhD, consider not just the topic but also especially your potential supervisor: that relationship can really make or break your experience. It is a long commitment, and the pressure to publish your research in journal papers is high. The personal struggles of doing a PhD can be just as daunting as the technical ones. But in spite of the challenges, this is by far the best job I have ever had.

The best way to find out about PhD opportunities here in Delft is to talk to professors doing research you like, and make your interest known. If you are interested in looking for opportunities somewhere new, consider joining the Coastal List ([coastal.udel.edu](http://coastal.udel.edu)), where new (mainly coastal) PhD positions are advertised all the time. If you are considering a PhD, come talk to the PhDs here in Hydraulic Engineering! Everyone has a different experience, so it's worth talking to multiple people to hear about the ups and the downs. We have been in your shoes before and are a pretty friendly bunch. Many of us can also be found at PSOR on Thursdays!



# HYDRAULIC PUZZLE

8	9				7		2	
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3			8					
7	6	2	1		3	8	9	5
					2			3
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	3		7				4	9

# HYDRAULIC PHOTO AWARD WINNING PHOTOS



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Rijkswaterstaat



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ARUP





# Kom jij het maken in de Waterbouw?

De Nederlandse waterbouwers zijn wereldmarktleider op het gebied van baggeren, havenontwikkeling en landuitbreiding en worden wereldwijd geroemd om de waterbouwkundige werken die zij realiseren.

Werken die landen en hun inwoners beschermen tegen overstromingen. Werken die gebiedsontwikkeling en transport mogelijk maken. Werken die economieën laten groeien. Niet voor niets heeft de Nederlandse overheid de waterbouw tot een van de meest kansrijke sectoren van de Nederlandse economie benoemd.

## Facts & Figures

- Totale werkgelegenheid: **10.000, verspreid over de hele wereld**
- Totale omzet per jaar voor deze branche: **Meer dan 11 miljard euro wereldwijd**
- Aantal bedrijven: **Ongeveer 250**
- Aantal werknemers: **Ongeveer 6.000 in Nederland**

## Bedrijven

In Nederland zijn zo'n 250 bedrijven als aannemer of dienstverlener actief in de waterbouw. Zij voeren in Nederland projecten uit voor Rijkswaterstaat, waterschappen, gemeenten, provincies en havenbedrijven. Internationale opdrachtgevers zijn onder andere grote oliemaatschappijen en projectontwikkelaars.

Bedrijven in de waterbouw houden zich bezig met de aanleg en het onderhoud van havens en waterwegen, landaanwinning, aanleg van kunstmatige eilanden, bouwen met de natuur en infrastructuurprojecten.

## Interesse?

Kom dan werken in de waterbouw, een branche met een breed carrièreperspectief zowel in binnen- als buitenland met aandacht voor je persoonlijke ontwikkeling en begeleiding gedurende je hele carrière.

 VERENIGING VAN  
**WATERBOUWERS**

# COLOPHON

'Swell' is a magazine which is published three times a year for all the members of 'Het Waterbouwdispuut' and her relations.

'Het Waterbouwdispuut' is the student association of the department of Hydraulic Engineering and Environmental Fluid Mechanics of the Delft University of Technology.

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Printed by:

Drukland.nl

Number of copies: 500

If the address no longer resides at this address, please send the new address to [secretaris@waterbouwdispuut.nl](mailto:secretaris@waterbouwdispuut.nl)

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