Delft Outlook
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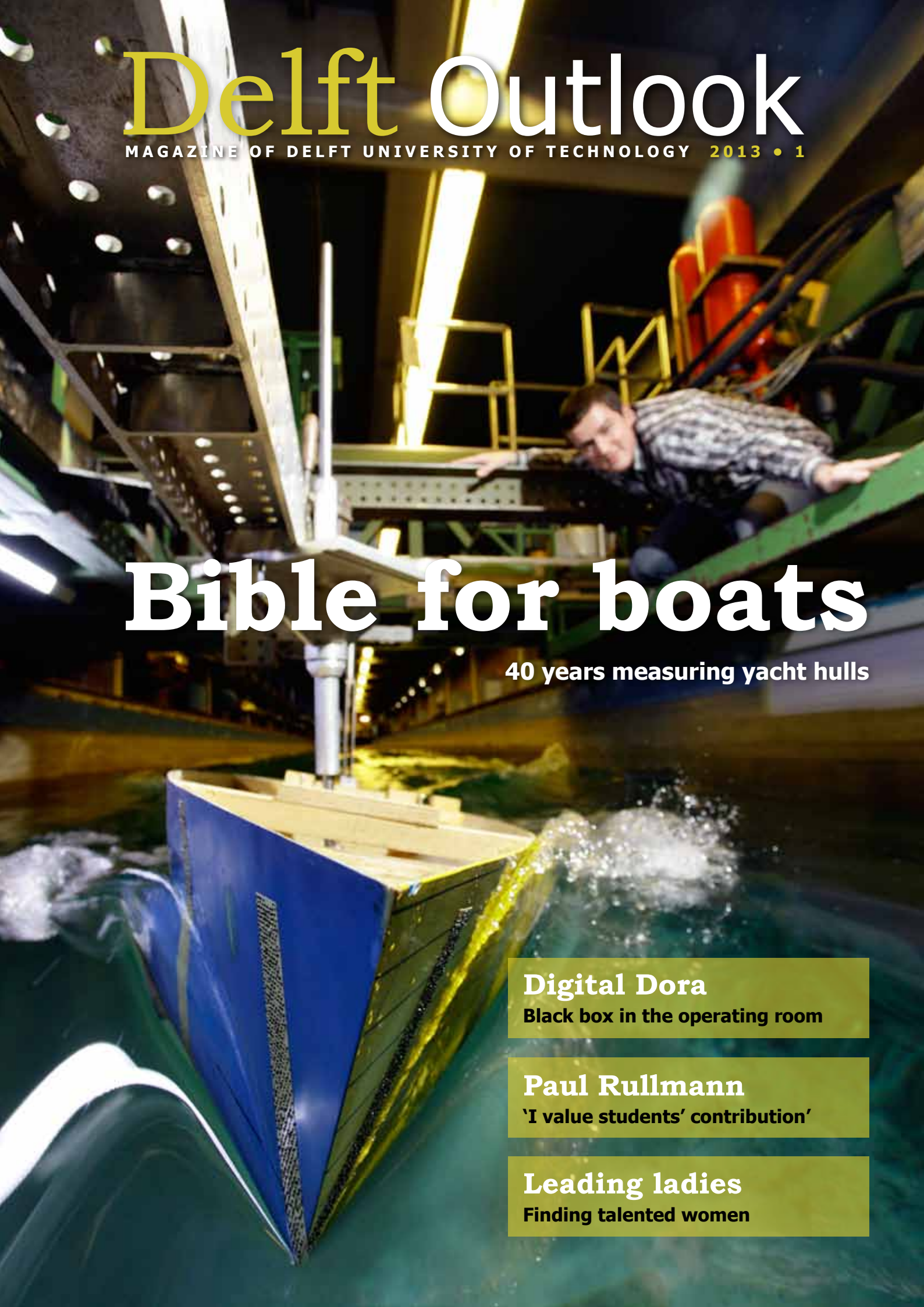

Bible for boats

40 years measuring yacht hulls

Digital Dora
Black box in the operating room

Paul Rullmann
'I value students' contribution'

Leading ladies
Finding talented women

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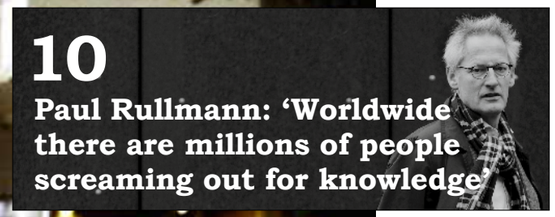

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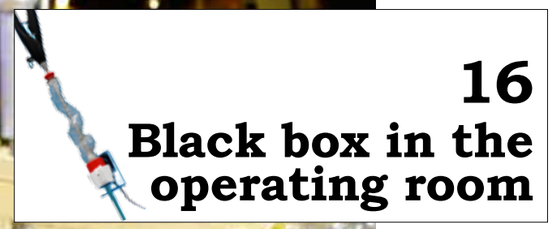
Paul Rullmann: 'Worldwide there are millions of people screaming out for knowledge'



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New building for Applied Sciences

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Lifework

In this edition two Delft icons tell us about their lifework. Lex Keuning is a familiar figure at the Delft towing tank. Indeed his fame is surpassed only by that of the old canine companion he always has with him. After nearly forty years of researching yacht hulls and two years before retiring, this boat expert is sharing his life's work with yacht builders and researchers. The Delft Systematic Yacht Hull Series is online. Paul Rullmann, a member of the Executive Board for nearly eleven years, is also always accompanied by a faithful old friend, his car. He will leave the TU at the end of March. His portfolio was education. Under his leadership the university grew from over 13,000 to 17,500 students and education changed drastically. Anyone who ever attended the opening of an academic year will recollect the inspiring way in which he can capture the attention of weary students with a cabaret-style speech. A talent the former sociologist no doubt acquired during the early days of his career as a musician in a folk band. After retiring, Rullmann hopes to have more time for music and wild water rafting. Wild water rafting is one of his passions. We wish him plenty more wild waters.

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Delft in Brief


Photo: Tomas van Dijk

Efficient dredging

The dredgers seem to be fighting a losing battle in the river Waal; the waterway is silting up more quickly as a result of the floodplains being lowered and the summer dikes moved. Reason enough for student Tim van der Lugt (CEG) to spend this winter trying out something new, together with the captain of dredger M.S. Dintel. Rather than levelling the sandbanks with a vertical plate, the dredgers take a 'bite' of sand, which they then move under water and deposit elsewhere. This reduces friction tremendously. The technique has not yet been fully developed. On one occasion, the stern of the ship completely disappeared under water when the flap valve of the plough failed to open quickly enough.

delta.tudelft.nl/26160

Get out of here

Evacuations could be accomplished more effectively and efficiently by equipping people in the affected area with simple means of navigation and communication, so argues PhD candidate Lucy T. Gunawan. Her crowd-sourcing evacuation is based on the assumption that most people in the area will be able to walk, and bundles their observations in the recommended evacuation routes. As a result people are less likely to make mistakes and get lost than only armed with a map. Gunawan believes her system could support and indeed replace the current centralised evacuation system.

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Can I help you?

Now that most shops are full of cameras anyway, we might as well do something useful with them, Dr Mirela Popa (EEMCS) thought. She managed to get the computer to track customers on video footage and to identify whether they are near any merchandise. Another system could recognise typical searching behaviour. The prototype could make staff observant of interested visitors in the shop.

delta.tudelft.nl/26186


Drawing: TU Delft

New lab quantum computer

To make the first working quantum computer circuit, based partly on the recently discovered Majorana fermions, that is the ambition of nanoscientists Prof. Leo Kouwenhoven and Prof. Lieven Vandersypen of the Kavli Institute of Nanoscience and Carlo Beenakker (Leiden University). In December the European Union announced that it would provide fifteen million euros of funding for this research. A new laboratory is to be built especially for this research.

delta.tudelft.nl/26100

Electric highways

If it were up to Dr Pavol Bauer (EEMCS), the drivers of electric cars would never again have to worry about being stranded at the side of the road with an empty battery. He foresees a future in which cars are wirelessly charged as they drive along a motorway with magnetic coils in the asphalt. Solar panels and wind turbines at the roadside generate electricity. "I have calculated that it is possible", Bauer says in Delta. "Now to convince the financiers." In January Bauer published three articles on this subject in the magazine 'IEEE Transactions on Industrial Electronics'.

delta.tudelft.nl/26205

Artist impression: Studio Roosegaarde

Robot institute

Late January saw the official kick-off of the TU Delft Robotics Institute, the new 'umbrella' for all robotics research in Delft. Practically everything made in Delft that communicates, flies, rolls, walks, runs, swims, creeps or grabs, was set up at 3mE. And that included the walking robot Leo, the running Phides and care robot Eva.

From walking...

Erik Schuitema met robot Leo

Robot Leo was programmed to teach himself to walk. It takes him about five hours, not counting the time it took him to pick himself up again. For his doctoral research, Dr Erik Schuitema (3mE) spent hours watching how the little 50-centimetre robot tirelessly moved his feet, fell over and then pushed himself up again. "It made me realise that this research is gradually winning ground, headed for a very distant goal", says Schuitema. Walking robots should be able to move among people more flexibly.

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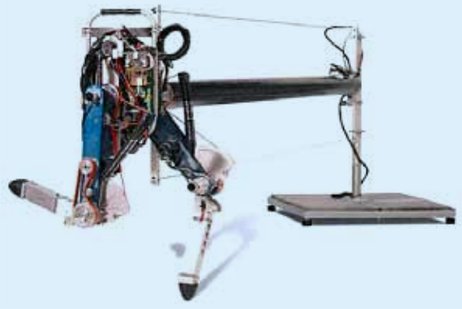
...to running



Fellow PhD candidate Dr Daniel Karssen also let his robot freely move round the Delft Biorobotics Lab, but then dancing like a mechanical ballerina. The objective of the running robot Phides was to establish whether and how disturbing influences could be reduced for people walking with prosthetic legs - influences such as irregular road surfaces, or a knock on the side. Karssen discovered that prosthetic legs are much more stable if special, nonlinear springs are used. After a certain point these actually generate less rather than more strength.

delta.tudelft.nl/26207

Eva cares

"Look, there's Eva", says one of the receptionists cheerfully at the Viva Zorggroep nursing home in Heemskerk. "We'll be out of work soon, thanks to her ", she adds, laughing. Care robot Eva got her first taste of work at the end of January when she visited a nursing home for the first time. A woman in a wheelchair recovering from foot surgery was also quite taken by Eva. "When I go to the bathroom, she can carry my clothes."
During a group discussion held later that day with employees and inhabitants it was agreed upon that it would not be a good idea to have the robot perform medical tasks, at least not in the near future. Eva will thus not be handling injection needles, that much is clear. Lively discussions were held about whether tasks such as feeding people, helping them with revalidation exercises, washing patients and measuring blood pressure could and should be performed by robots. "All tasks that need human interpretation should always be performed by people" one of the attending doctors stated which pretty much concluded the whole discussion.
Marcel Laan, IT-manager of the nursing home, who invited the Delft researchers, is not disappointed. "Eva isn't really capable of doing anything", he says. "This technology still needs a lot of work. We have always been interested in new technologies and we are thrilled to be at the forefront of these developments in robotics."
In time, Dr Joost Broekens, researcher with the interactive intelligence research group (EEMCS), hopes that she will be able to take lost patients back to their rooms. At the end of the year the robot will come to the nursing home for a week's trial.

delta.tudelft.nl/ 26246

Refreshing
The American Super Bowl event is all about big names and big money. IDE student Alexandra Izeboud did some defining work for the event. During the interval, singer Beyoncé performed, sponsored by the soft drink brand Pepsi. A photo had already been taken of the singer with the date on her cheeks but they were still looking for a picture that would link the singer and the soft drink. Izeboud shot the portrait in black and white and projected the red, white and blue Pepsi logo onto her lips. Boom! The two big names were united in one glance.

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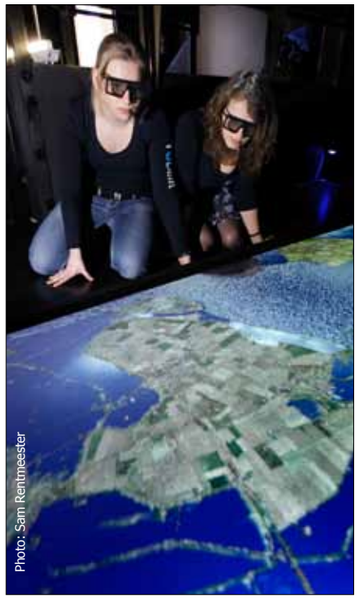


Flood disaster in a nutshell

TU Delft researchers Dr Olivier Hoes (CEG) and Christian Kehl (EEMCS) have combined the latest geo-informatics with hydraulic calculations and computer graphics in an interactive 3D-image of the floods of 1953 which struck the provinces of Zeeland, Zuid-Holland and West-Brabant. Dikes breached at more than four hundred locations and some places were still flooded six months later. This setup can be perceived and experienced in the TU Delft Science Centre.

delta.tudelft.nl/26247

Stabilised laser

Researchers of MIT have developed a new terahertz laser, the size of a comma. PhD candidate Yuan Ren (Applied Sciences) has managed to stabilise this laser, making it suitable for astronomical observations on board satellites or balloon missions. The new form of astronomy should improve our understanding of the creation of stars and planets. It is a great step forwards in terms of terahertz astronomy, his supervisor Dr Jiang-Rong Gao believes. This spring NASA will decide whether this Delft technology will be part of the missions.

delta.tudelft.nl/25977

Auxiliary branch for LED

In 2011, TU Delft opened its first research centre in China, followed by another three centres last November. But the reverse is also possible. In January, the Chinese State Key Laboratory opened an office for research into Solid State Lighting (LED lighting) within TU Delft's research institute DIMES. Together, SKL and TU Delft aim to expand knowledge and to attract more financing for research into LED lighting by means of these shared centres.

Kunsthaus in Graz (Austria).

Fascinating façades

PhD candidate Holger Strauss (Architecture) expects it will be some time yet before a 3D printer can produce whole buildings. But such new production techniques do bring freely designed computer façades a little closer. Strauss expects that mounting systems with individually printed components will simplify the production of fascinating façades. This will be the beginning of an entirely different approach to façades, he believes: as a dynamic shell that both separates and connects indoors and outside.

delta.tudelft.nl/26169

Photos: Sam Rentmeester

Dr.ir. Lex Keuning at the K&M Yachtbuilders wharf in Makkum.

Bible for boats

After nearly forty years researching yacht hulls in the Delft towing tank, boat expert Dr Lex Keuning has decided to share his life's work with yacht builders and researchers. The Delft Systematic Yacht Hull Series is available online.

Jos Wassink

Due to an unfortunate combination of events, Dr Keuning was unable to personally attend the presentation of his systematic series at the Hiswa Symposium – the annual symposium on yacht design and yacht construction. TU Delft researcher Michiel Katgert did the honours. He explained that the full measurement data of seventy hull shapes over the last 39 years, as well as the forty publications based on these data, are now publicly available to anyone who takes the trouble to request a login (at dsyhs.tudelft.nl). According to Katgert, these measurement data can then be used to develop software that will predict the performance of ships during the design stage (the so-called velocity prediction programmes or VPPs). The Delft data can also be used to validate numerical approaches to a ship's resistance, for example. Katgert asked designers at the symposium to post on the website discussion forum to let them know how they use the data. "We invite you to participate in our research." That sounded very open-source and contemporary, but a little later Katgert had to admit that expanding the series was no longer an option in Delft.

Mathematical aid

Yacht designer and ocean yachtsman Gerard Dijkstra made a name for himself with the 'Stad Amsterdam' (which featured in the VPRO series 'Beagle'), the mysterious three-master 'Maltese Falcon' and Greenpeace's new mother ship: the motor yacht 'Rainbow Warrior III'. When performing design calculations, Dijkstra prefers to use 'the Delft series' or 'Sysser' (systematic series). During the coffee break at the Hiswa symposium he said: "I have been familiar with the series from day one and witnessed its development. That inspires confidence."

'There are forces above and under water which together form a complex balance'

Keuning (62) witnessed the beginning of the series as a student. That was in 1973 when Professor Jelle Gerritsma, Professor of Ship Hydromechanics, wanted to start generating comparative measurements of yacht hulls. He did this together with two colleagues from Massachusetts Institute of Technology who shared his passion for yachts and sailing. The two men concerned were Nick Newman, Professor of Ship Hydromechanics, and Justin Kerwin, Professor of Hydromechanics. The objective was twofold: to create a mathematical aid to enable yacht designers to determine the sailing properties of their design and to develop a method of calculating the handicaps of the various yachts in a yachting race.

"It is much more difficult to predict the velocity of sailing yachts than that of motor yachts", explains Keuning (3mE faculty) in his office next to the towing tank. His aged dog is lying near the door. "There are forces above and under water which together form a complex balance. This is difficult to calculate by hand. A programme was needed that could approximate a ship's performance based on its length, breadth, depth and water displacement."

The research needed to be systematic. This means using adjustments on the basis of a standard-model ship. The ship chosen as standard was Frans Maas' 'Standfast 43', a 13-metre sailing yacht of which a 1:6.25 scale model was built. Keuning explains the adjustment process: "Taking the mother ship as starting point, we increased and reduced the width slightly. This resulted in three models, which were all dragged. Any differences in resistance that you measure are consequently attributable to the difference in width. You can do the same with the length, draught and displacement. That

Yacht designer Gerard Dijkstra: "The series inspire confidence."

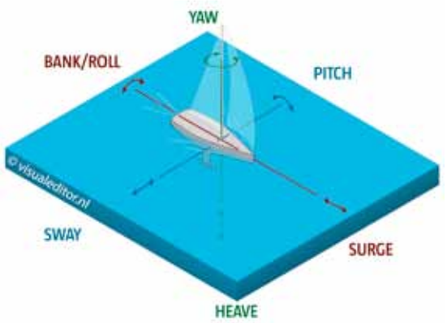
sounds simple but adjusting the width also changes the displacement. There are many interdependencies."
The first systematic series consisted of nine models.

Towing tank

The measurements were performed in the large TU Delft towing tank: 142 metres long, 4 metres wide and 2.5 metres deep. As all the measurements were performed using the same method and the same equipment, they are not only comparable with each other but also with the measurements of later models.
Drag tests involve a 4-ton aluminium carriage travelling along rails on either side of the tank at a maximum speed of nearly 30 km/h. Below a hull model, fully lit, cuts through the waves. The hull is hinged – only the angle between the heading and the track (the drift angle) is registered and the angle with respect to the vertical (slope). This is where we encounter nautical terminology such as pitching, heaving and yawing (see more in the box on ship movements).
The measurements take at least a week for each hull. Just consider: besides the upright measurements with and without out a keel, measurements are performed at four different speeds, four different slopes (angle with respect to the vertical) and four different drift angles (angle with respect to direction). That's at least 64 measurements and after each measurement it takes a quarter of an hour for the water in the tank to settle sufficiently for the next test.
Among others, each test produces values for the resistance (the tractive force exerted on the model in the direction of displacement), the lateral forces, the fore-and-aft angle of the yacht (trim) and how far the hull sinks (immersion). Asked how often a test is repeated, Katgert answers with a smile and the maritime adage: "Thou shall never measure twice." In this field, absolute measured values (and the applicable margins) are less important than the differences between them. It's all about serial comparisons. The reproducibility of the measurements is always verified. In the case of the series, for example, the models were dragged again after twenty years and the differences were within one to two percent.

Largest measurement series in the world

After those nine models the Delft group wanted to continue, but the Americans pulled out: the money had run out. The research could continue in Delft as long as the researchers were still motivated enough and yacht builders were interested in the results.
A new measurement series consequently followed in 1982, based on a design by Van der Stad & Partners; in 1993 there was a series based on a model by Sparkman & Stephens and in 2007 a model by Judel & Vrolijk was the last mother ship for the time being. The Delft Systematic Yacht Hull Series (DSYHS) comprises a total of seventy systematically varying and mutually comparable hulls, which makes it the largest systematic series in the world.
"Whether a boat is 4 or 140 metres long, the series still applies", Dijkstra says. The ship hydromechanics research group has hence written a bible for boats, which will serve as a standard for yacht builders and racing sailors for years to come.
The data from Delft form the basis for the velocity prediction programmes or or VPPs that yacht builders use during the design stage. "The nice thing about the systematic series is that you don´t have to design using a model that has been dragged", Dijkstra explains. "You create your own design based on your experience and the client´s wishes in terms of length, width and draught. This forms the operational profile of the yacht. Using WinDesign (one of the VPPs, ed.) you then calculate the performance and iteratively modify your design until you reach the best compromise that meets the client´s requirements. If you base your performance calculations on this series, you´ll always know that your ship will sail properly."
In fact, Dijkstra doesn´t take the velocities that WinDesign specifies for the various directions all too seriously. Due to the structure of the atmosphere and the wave pattern of the water the actual velocity will often deviate from the theoretical prediction. You´d be lucky to get a match within five percent. But, once again, it´s all about the mutual comparisons.



SHIP MOVEMENTS

	TRANSLATION	ROTATION
X-axis (fore-and-aft)	slacking (change)	rolling
Y-axis (transverse)	driven off course (dynamic)	pitching
Z-axis (mast direction)	heaving (dynamic)	yawing

It is much more difficult to predict the velocity of sailing yachts than that of motor yachts.

Handicaps

The same applies when using the systematic series to determine handicaps. As a researcher, Keuning is a member of the International Technical Committee of the Offshore Racing Congress. In this competitive world, the handicaps of the various yachts are determined using VPPs based on the Delft systematic series. "This enables us to apply a correction for the length or weight of the ship and establish who sailed best of all", Keuning tells us.
Asked whether the series is to be extended, he answers with a sigh. Followed by:
"There's no money left for that." Keuning would like to add lightweight, plane sailing yachts to the series. Dijkstra sometimes comes on to drag an extremely long, slimline model. "A twelve-metre yacht used to be quite spacious; nowadays a hundred metres is perfectly normal", he explains. While these data are added to the series, clients prefer to keep racing yacht data to themselves. Contrary to what they were used to, the group now has to wait to see what they are offered in the way of drag testing.
And Keuning? He is working on a good handover. He will spend the last two years up to his retirement passing on his knowledge and experience of sailing yachts and fast motor ships to his successor as well as possible. He also plans to go sailing more often, with his twin brother for example. Not around the world, but to Britain and the Baltic would be nice enough.

'If you base your performance calculations on this series, you´ll always know that your ship will sail properly.'

‘You must believe in the steps you take’

Paul Rullmann decided to leave TU Delft in April, after nearly eleven years on the Executive Board. He started his career as a musician in a folk band but ‘bounced on’, via a tutorship at a university of applied sciences, into policy. Under his leadership TU Delft grew from over 13,000 to more than 17,500 students and education changed drastically. But times were not always good.

Saskia Bonger

Did you ever imagine you’d stay this long, as a sociologist among the techies?

“I found myself in an entirely different kind of organisation to what I was used to, with a character all its own. It was far from certain that I would form a good combination with my colleagues, but that certainly worked out well. I really do understand technicians’ passion, how they can be totally absorbed by their research, how it can keep them awake at night. And, given half a chance, leap on their bikes at six a.m. to test whether what they devised in the night really works.”

Do you sometimes lie awake like that?

“I used to. I’d lie in bed building crystal receivers, wishing the night away, so that I could do some more soldering. So I do have technical streak. I took science subjects at high school. I went on to study pharmacy but didn’t complete the programme. I was very disappointed. Maybe it had something to do with the programme information back then. I had expected to be helping people with medicines, but it was much more of a combination between chemistry and retailer’s certificate. It was very far removed from medicine. But tinkering fascinated me. I could well have become a dentist or a watchmaker.”

Things turned out very differently. No tinkering; setting out broad outlines.

“I got here gradually, step by step. I was a member of a folk group called Crackerhash, meaning ships biscuits. It was a fairly uncertain living so I needed to earn a little more elsewhere. So I became a lecturer at a university of applied sciences. I taught social subjects: sociology, political science, social psychology, social skills. I became more and more involved in policy. I went from lecturer to lecturer coordinator, policy officer, Head of the Policy department to Secretary to the Executive Board and, ultimately, to Member of the Executive Board. I have never had a clear-cut career in mind, I just bounced on and on.”

Wouldn’t you secretly have liked to live a rock&roll life?

“No. I really enjoy music, but a musician is something you have to be. It’s wanting to start playing the second anyone wakes you in the night. I did have the choice. Friends of mine made a living for themselves as musicians, I preferred it to be a hobby. We formed Crackerhash in 1968. We lasted around 35 years. I’ve seen every youth club in the Netherlands. We played English sea shanties; later we wrote our own Dutch lyrics. Made a record, made a CD, and in 2004 we even played a farewell concert.”

What kind of lyrics did you write?

“Contemporary cabaret. Not too political as we wanted to be able to play a song for quite a while. They were often about the morbid side of life: things that go wrong or take a strange twist. Things like love, or which till queue to join. Yes, you always choose the wrong one.”

As the third member of the Executive Board, you were given the portfolio of Education. That was newly created. Why?

“There needed to be more focus on education and a better balance between education and research. The education itself was good but it was very compartmentalized and not very exciting. We started with the report Focus on Education. This led to a whole host of changes: more projects during the degree programme, more use of ICT, the major/minor model. This has made education more attractive.

Perhaps the most difficult thing was to create more cohesion within the teams of lecturers in how they thought about education. After a few years of the Bachelor/Master system, it turned out that it especially worked for us in terms of administration, but that there was no clear division in the study programme. We then implemented the Bachelor-before-Master rule. Other measures followed later, such as the binding recommendation on the continuation of studies, the introduction of guarantee months for study projects. All in all, education has livened up significantly. This has contributed to the continuing increase in the number of students. In 2002 there were over 13,000, there are now 17,500. A much needed rise as there is still a shortage of engineers in the Netherlands.”

Many of the students are from abroad. They are not going to solve the shortage of engineers.

“Some of them certainly will work in the Netherlands. International students are extremely important. The Netherlands can keep all the doors firmly closed, thinking we can manage alone, but it doesn’t work that way. We need international companies and relationships.”

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Photos: Sam Rentmeester

‘I really do understand technicians’ passion, how they can be totally absorbed by their research’

You have always been an advocate of digitalisation. Will the university eventually disappear as a physical location?

"In the Netherlands you don't even really need digitalisation. We have a university or university of applied sciences on every street corner. But worldwide there are millions of people screaming out for knowledge. There are now countless institutions that provide digital materials, including really large ones like Stanford and MIT. They invest millions. This is becoming so important that it will affect the reputation of an 'ordinary university'. You have to be part of it."

This also requires lecturers to make considerable changes. That's quite alarming for them.

"That may well be, but take Collegerama. It all started rather hesitantly but now we can't meet the demand. Not that all the lectures included are good enough to publicise but the lecturers are practising and improving. Research is now very highly valued internationally. The same cannot yet be said of lecturers but they will soon have to fight international competition with very good online material. It places lectureship in a different light altogether, lecturers need to create a different kind of added value."

Following the OOD reorganisation in 2005 you were appointed Manager of the University Corporate Office. What prompted that decision? It could lead to strange situations.

"People have sometimes accused me of working hand in glove with the University Corporate Office. And it's true, very occasionally you do find yourself in two camps. But I would rather have that occasional tension than have to take on another manager. So we have the Executive Board, with below them a manager and below him the directors of the various support services. This automatically means that the manager meets with the Executive Board and the director merely performs.
Now, we happen to have proactive directors who are capable of accomplishing things themselves. That is why we would like to keep the organisation as flat as possible. The biggest advantage is that between the various boards of directors we can develop policies for the whole university. Take ICT for example: when I first came here there was a firewall between this building (3mE, ed.) and CEG if you wanted to send a mail. Now we have one, open system. The professionalism, speed and reliability are tremendous. The same applies to finances and education. The cohesion within and between the services has grown tremendously. Of course, there were several teething problems initially."

As manager implementing the changes enforced by the OOD, you have to be able to handle criticism. How do you deal with that?

"I'm a die-hard optimist. My first reaction to the problems during the OOD was always: Oh we'll get that sorted. You must believe in the steps you take. Something I learned from Hans van Luijk (former President of the Board, ed.) was that you should be able to explain in one or two sentences why you are doing something. At OOD that was quite clear: we are to ensure that by providing less support, more money will become available for the scientific process."

How did you get the Student Council to remain so constructive, even if they disagreed with your measures?

"In some respects, students can be very conservative. But you still have to convince them. How I do that? With a lot of talking. I don't have a hidden agenda. Students may know where I'm headed. I am apparently able to include them in the puzzles we face as Board. Students on the Student Council are exempted for a year so they can bombard you with questions. This has sometimes led to heated discussions, sometimes even to a dispute. I value their contribution. They know the organisation, they gather information which we would not otherwise be able to obtain. They spot any bottlenecks sooner."

What do you consider the highlight of your time at TU Delft?

"The rise in the number of students and education being enlivened. The move to set up an independent department of Education and Student Affairs was a very good one. That was part of the OOD. This generated many incentives. The appointment of Directors of Education, one for each faculty, also helped. These eight directors can reach decisions and compromises far more easily than the room full of Directors of Studies that we used to have. It has led to more coherence with regard to assessment policy, timetables, regulation and educational renewal. There is a firm conviction that collectivity will help us more than division."

And what was the lowest ebb?

"The NRC affair (a series of articles in NRC Handelsblad about claims by the Executive Board and the financial situation of the university). I felt it was discourteous and was shocked that a journalist could arrange the facts in such a way with the intent of harming you."

Are you looking forward to your retirement or worried you won't know what to do?

"I would like to remain active in committees or boards but it will be lovely to have more time for things like music and sport."

Who is Paul Rullmann?

After leaving secondary school Paul Rullmann, born in The Hague in 1948, went to study pharmacy. Disappointed with this study, he switched to sociology. Rullmann taught in higher education and held several management positions at the Haarlem University of Applied Sciences. Between 1990 and 1995 he worked as policy officer with the Netherlands Association of Universities of Applied Sciences. Rullmann then returned to Haarlem University of Applied Sciences. Among other things he was Secretary to the Executive Board (EB) and was appointed member of the EB in 2000. When the university of applied sciences was incorporated into the Inholland University of Applied Sciences, Rullmann moved to Delft in 2002. His function as third member of the EB entailed various secondary activities. Among other things, he was a Board Member of Studielink, Board Member of Studiekeuze 123 and Chairman of the Supervisory Board of Academic Transfer.

Idiot?

Remco de Boer is a technology & science communication specialist

"Nonsense. We emphatically dismiss this as a myth." With these historic words, the NAM (Netherlands oil and gas company) initially quashed the theory of any possible connection between gas extraction and the earthquakes that have been shaking the north of the Netherlands since 1986. The hypothesis originated from provincial councillor for Drenthe Dr Meent van der Sluis. The NAM said it was "unfounded nonsense". The oil company felt the same about TU Delft alumnus Willem Meijborg's warning at the beginning of the 'Groningen gold rush' in 1963. The civil engineer – nicknamed 'Willem Beton' (concrete Willem) – warned of the downside of gas extraction, such as subsidence. He stood alone.
'Slochteren' is a fine example of the gaping hole between the authorities on the one side, with 'their' engineers and the justified need for proof, and the intuition and theories of freethinkers who don't give a hoot about the communis opinio on the other. The problem, however, is not that the authorities want hard evidence; the problem is the sharpness and the disdain with which other opinions are rejected and their mouthpieces written off as idiots. That, in particular, created ill feelings, especially when it turns out they weren't so 'crazy' after all. The authorities' opinionated attitude undermines people's confidence in them and hence their authority. As is the case in Groningen.
That people who think differently are often shot down in flames, is because they are outnumbered. With every initiative, the use of any new technology, or indeed a new use of an old one, there is always someone predicting Armageddon. Get used to it. Politicians, governments, scientists and engineers had all better get used to it. If only for the fact that in most cases there is at least an element of truth in their warnings. The awareness of this should be the first step towards an attitude where 'conformists' stand by the need for scientific proof while openly allowing for the possibility that all might not be quite what it seems. An attitude which openly admits that every technology, by definition, has its disadvantages, though possibly unknown when first introduced. Or, as the former US minister Donald Rumsfeld put it: "There are things we know we know. Then there are things that we know we don't know. But there are also unknown unknowns: things we do not know we don't know."
A wisdom worth bearing in mind during the forthcoming shale gas discussion. So should an 'idiot' submit a theory that seems even shakier than the soil in Groningen, remember: *That 'idiot' might just be right.*

Photo: Sam Rentmeester

Photo: Sam Rentmeester

The most technologically advanced tram line in the Netherlands is to be built here. Worried about the magnetic field that the tram´s 1000 amps DC would generate, the executive board examined measures to prevent diffuse fields. Prof. Lou van der Sluis (EEMCS) and Prof. Pieter Kruit (Applied Sciences) found a solution and patented it. In the Mekel Park the electricity supply for the overhead wire is underground to minimise the loop between the feed and return current. Between every two conductors the overhead wire is fed from two directions.

TEN leading ladies

A case of discrimination or not? That was the question asked when TU Delft announced that it was going to look for talented women: scientists who would get the chance of a tenure track in Delft in order to accelerate their careers – the aim being to raise the dismally low number of female researchers in Delft.

Saskia Bonger

In 2012, women accounted for 24 per cent of all assistant professors, eleven per cent of all associate professors, and eleven per cent of full professors. The TU Delft scores in this area are notoriously low.
This was ultimately the reason that the Netherlands Institute for Human Rights (the former Dutch Equal Treatment Commission) ruled that TU Delft was not discriminating illegally when recruiting for the fellowship. The ruling was in response to a complaint. In practice, the degree to which women lag behind is so great that giving them a helping hand is a matter of necessity.
Of the ten women who have now been appointed, two are full professors, two are associate professors, and six are assistant professors. They are spread across seven faculties, all except Aerospace Engineering. As well as their salaries, they will be receiving three hundred thousand, two hundred thousand, and one hundred thousand euros respectively to set up their research projects.
Two-thirds of the costs of the fellowship are being paid by the Executive Board, with the remainder being made up by the faculties to which the scientists have been appointed. Depending on the level at which they enter, the university will be making between 10.5 and 14 million euros available for a total of twenty fellowship participants. Another ten (at the most) female scientists will be appointed to the fellowship in 2014.

1. Rafaela Hillerbrand (associate professor at TBM)
Nationality: German
Researching: the philosophy of science and technology. Examples of Hillerbrand's work are computer simulations of everyday scientific and engineering practice. She is also working on uncertainty in climate models and the relationship between energy-related technology and (social) life cycle assessment.

2. Wioletta Ruszel (assistant professor at EEMCS)
Nationality: Polish; grew up in Germany
Researching: as a mathematician, Ruszel is creating models of processes on random structures at the fundamental level, such as the communication between neurons in the brain.

3. Philomena Bluyssen (full professor at Architecture)
Nationality: Dutch
Researching: the quality of the indoor environment in buildings and the possibilities of improving it by taking the wishes and needs of users as her starting point.

4. Maria Santofimia (assistant professor at 3mE)
Nationality: Spanish
Researching: the characteristics of metals at a fundamental level. "At the micro-level, metal consists of different components. I am conducting research into how these components are formed and how they influence the characteristics of a metal."

5. Nuria Llombart (associate professor at EEMCS)
Nationality: Spanish
Researching: how the number of photons that end up in the detectors of teraherzt antennae can be maximised. That increases the sensitivity of the antennae, which can be used in space and for security purposes, to detect weapons for example.

6. Marie-Eve Aubin-Tam (assistant professor at AS)
Nationality: Canadian
Researching: the movement of proteins in membranes. "Important processes take place in membranes. The toxins from bacteria are transported through membranes by passing proteins. This is how toxins are injected into our cells. If we can understand how that works, we can use the same strategy for introducing medication into cells. There are always new methods needed for doing this."

7. Hayley Hung (assistant professor at EEMCS)
Nationality: British; her parents come from Hong Kong
Researching: how machines can be used to understand human behaviour. Hung talks to architects about positive behaviour and well-being in public spaces. How can machines identify and affect particular types of behaviour without eavesdropping?

'The degree to which women lay behind is so great that giving them a helping hand is a matter of necessity'

8. Heike Vallery (assistant professor at 3mE)
Nationality: German
Researching: robots that can help people walk and that do so in as unobtrusive a way as possible. For example, Vallery is researching a device that helps people retain their balance. The device should preferably fit into a rucksack and only start working if when people are at risk of falling.

9. Elisa Giaccardi (full professor at IDE)
Nationality: Italian
Researching: One of the projects Giaccardi is now working on is with Volkswagen, the aim being to design a shared car in which users can leave their personal stories so that the car connects people.

Miren Vizcaino (assistant professor at CEG)
(not in the picture, starting on 1 March 2013)
Nationality: Spanish
Researching: the relationship between continent-sized glaciers and the climate. Vizcaino would like to ensure that these ice caps become a standard part of climate models, as the water melting off them will cause sea levels to rise.

Photo's: Sam Rentmeester

Dora will watch over you

A black box, but then in the operating room. Meet the digital surgical assistant Dora. TU Delft is developing the system together with hospitals and businesses in the province of Zuid-Holland. “We can learn a lot from aviation.”

Jos Wassink

Photos: Hans Stakelbeek

From left to right: wristband; lead through with color detector; RFID chip equipment; iPad.

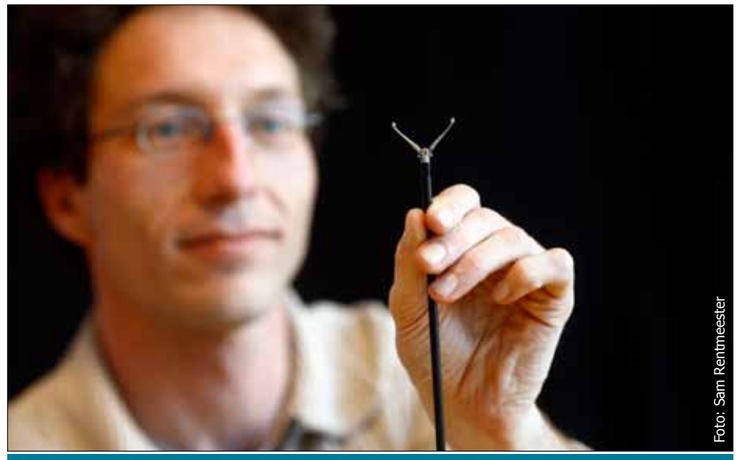

Foto: Sam Rentmeester

Dr. John van der Dobbelsteen: "Two minutes work for fifty percent fewer faults".

Dora is the ultimate Big Brother machine in the operating room. She monitors patients from the moment they come in. She films the operation, registers the instruments used and identifies the equipment. Big Sister doesn't miss a thing. But what about the patients' privacy?

Funnily enough, initial trials reveal that patients are less interested in their privacy than in correct and safe treatment. Staff, on the other hand, are worried about the consequences of registering medical mishaps. Research reveals that 1900 people die in Dutch hospitals every year as a result of 'avoidable medical errors'. Errors involving wrong medication, faulty equipment and hygiene errors, for example. Over 200 cases of unnatural death in hospitals are reported to the Dutch Public Prosecution Service every year.

'Doctors tend not to report mistakes for fear of legal action'

The remaining 1700 cases are apparently not reported. "Doctors tend not to report mistakes for fear of legal action", observes Frans Hiddema, CEO of the Rotterdam Eye Hospital. He would nevertheless prefer to have all operations video recorded.
Contrary to the aviation sector, where no stone is left unturned to find the cause of an accident, mistakes in the operating room are still often covered up. In this fairly closed culture people have grown used to the fact that equipment sometimes doesn't work optimally and consider the fact that operations take longer than scheduled as inevitable as autumn rains. Dora is an attempt to improve through registration and transparency.

Checklist

The findings of the then trainee surgeon Dr Emiel Verdaasdonk were the starting point for the Dora project. In 2006 he had conducted an observation study into the practice of keyhole surgery to remove the gall bladder. In 86 percent of the operations there were one or more 'incidents' with medical equipment and in 45 percent of the operations equipment was unavailable or not set up properly.
"But if you asked the operating room staff about this, they hadn't noticed anything", explains head of the Dora research project Dr John van den Dobbelsteen, of the Biomechanical Engineering department of the Faculty of Mechanical, Maritime and Materials Engineering (3mE). "They are that used to incidents with equipment."
Emiel Verdaasdonk compiled a checklist to be used before an operation commences to check that all equipment is available and in full working order. A tried and tested method applied in aviation. "Two minutes work for fifty percent fewer faults", Van den Dobbelsteen summarises the effect of the list. There was nevertheless some opposition to the checklist. Some felt it was for dummies while others felt there was nothing hi-tech about ticking off a checklist with a pencil. Was there no alternative?

'Have you seen the coagulation machine?'

An automated checklist is indeed under development in the Reinier de Graaf hospital in Delft. Clinical physicist Dr Joleen Blok is collaborating with TU researcher Annetje Guedon (3mE) and the company Double Sense to develop a system that uses radio chips (RFIDs) to check whether all necessary equipment is available. For the purpose of the test a hundred pieces of equipment, including anaesthetic equipment, laparoscopy towers, lasers and pumps have been fitted with an active RFID the size of a pillbox. It contains a registration button, a motion detector and a red LED light. If the piece of equipment is moved the RFID transmits a presence signal which is received by the central system. This is how Dora knows which piece of equipment is where. All being well Dora should soon also know which operation is scheduled and which equipment is required. She also knows the maintenance status of all the equipment. Dora will only display a green light on the iPad on the wall if all the equipment present is in correct working order. "In theory, the operator is responsible for checking that the equipment is in correct working order", Blok says, "but in practice he really doesn't go round checking all the equipment and stickers himself. Now all he has to do is check whether Dora displays a green light." Reporting faults has also been much simplified and standardised.
The system was implemented in part of the hospital in October. "There were a hundred teething problems," Guedon says smiling, "but at least it is being used." Asked when the implementation would be a success, they both answer: "When we receive lots of fault reports."

Partners in the Dora project are the LUMC, Reinier de Graaf Groep, Bronovo Hospital, Rotterdam Eye Hospital, TU Delft, Ayton, Sense IT, Jalaco, NewCompliance, LogiSense, MediShield, Accenda, PRSD Studio, Cofely, LogiMedical and Repoint. The total budget is 3.6 million euros over a period of two years. Half of this is to be funded by the partners, the other half by the province of Zuid-Holland.

'The patient has been in the corridor for an hour'

Just as with imperfect equipment, many hospital staff consider operation schedules running late an inevitable natural phenomenon. This does not apply for gynaecologist Prof. Frank Willem Jansen (LUMC) and information scientist Dr Loubna Bouarfa, who recently obtained her PhD. "Hospital planning systems are extremely basic", Bouarfa concludes in her doctoral thesis Recognizing surgical patterns. "Practical data are not used to adjust the system and thus improve the efficiency of the system from the field."
Jansen puts it slightly differently: "What we'd like is a Sat Nav in the operating room, so to speak, that automatically monitors the progress of the operation and dynamically predicts how much longer it will last."
A system like that would be a blessing for the wards and patients, who could see when it's their turn by looking at a board. It could alleviate the complex planning system and put an end to annoying phone calls because everyone could see who should be where.
However, automatically determining the stage of an operation is by no means simple. Doctor-researcher Mathijs Blikkendaal (LUMC) explains how they plan to do this using a camera, light sensors and a microphone. The camera detects the blue cloth covers – indicating that an operation is in progress. The light sensors register coloured bands round the handles of the instruments used for the keyhole surgery; forceps, needle holder and scissors each have their own colour code. And the microphone registers bleeps that are specific to the use of a needle holder or coagulation forceps (to coagulate the blood).
Based purely on the type of operation and basic patient data (age, weight, gender) a system developed by Bouarfa can predict the end time of an operation 12-18 minutes more accurately compared to the average duration. Add the signals from the camera, light sensor and microphone and predictions will be even more accurate, Blikkendaal expects.
Trials during which Dora will run simultaneously with the operating room planning are due to begin in the middle of next year. These will reveal whether Dora predicts the duration of an operation more accurately than the current system.

'How much longer does Mother have to wait?'

In the Rotterdam Eye Hospital, it is not the duration of the treatment that varies as much as the patients' waiting time. "One might be treated within five minutes while another has to wait an hour and a half to even be seen" Safety & Quality advisor Dr Dirk de Korne says, summarising the problem. As measurement is the initial source of knowledge, the Eye Hospital has implemented a patient monitoring system. Upon arrival, every surgical patient (of which there are 14 thousand a year) is given a wristband with an RFID chip, which registers his or her location in the hospital. This enables family members accompanying the patients to see where they are (still in OR or has the operation finished?), nurses can prepare their patients in good time, and many annoying telephone calls can be avoided. Over the coming period, data analysis conducted by TU Delft researcher Dr Linda Wauben should reveal how waiting time can be made more uniform and reduced.
Besides aiming to improve efficiency and patient safety, Dora also raises questions about protection of the privacy of both patients and practitioners. As was evident during the working conference on Improving Operation Processes at Yes-Delft on 27 September. The conference called for more transparency by means of systematic data collection, better analysis of the data collected and feedback of the findings to the practitioners.
Director Hiddema (the Eye Hospital) expects more transparency in the OR to coincide with the emergence of a different kind of doctor: a team player rather than a soloist. Quality advisor De Korne does not expect more openness until surgeons no longer have to fear claims or criminal proceedings. "The Dutch Public Prosecution Service wants to blame someone but, for us, the question is not who was wrong but what went wrong."
Hiddema feels medics should follow the example of the aviation sector, which, in the event of an accident, gives priority to the Dutch Safety Board rather than criminal law.

Brand new building

Faculty Applied Sciences

Images: Ector Hoogstad Architects

Around 800 students, 30 professors and some 600 other staff from bionanoscience, chemical engineering and biotechnology will be moving to a brand-new building on Kluyverweg at the end of 2015. Construction is to start in September and must be completed exactly two years later. The building will have a floor space of 30,000 m^2, spread across three stories. Above these will be a fourth floor containing installations/plant.

The building will contain extra-high, vibration-free laboratories, fermentations labs, chemistry labs and practicum rooms with lots of fume cupboards, as well as teaching and meeting rooms, offices, project rooms, two studio classrooms and a faculty meeting room.

Green space is provided in the form of a roof garden and two patios containing courtyard gardens, and the building will be set in park-like surroundings in line with the TU Delft campus. Kluyverweg itself will be car-free, but there will be 270 parking spaces. **(SB)**

Stellingen

Physics is not more real than your faith in it.
Ciprian Padudariu, physics engineer

Open access publishing costs money but is not expensive.
Gerard Ignaz, water engineer

If one wanats to track frogs in Brazil, courage is the prerequisite.
Geisa Evaristo, biotechnological engineer

Science is similar to a religion. It's not only about belief, but also about the way to collect money.
Haining An, physics engineer

Research without basic questions leads to a lot of publications.
Arjan Oudshoorn, phisics engineer

The vegetarian knows more about meat than the meat eater.
Jodi Kooijman, mechanical engineer

Designers overestimate the value of intuition. Scientists overestimate the value of the scientific method.
Thomas Visser, design engineer

Cars with an 'eco' badge are a form of postindustrial sarcasm.
A. Janszen, mining engineer

Stelling

Commercial journals are death to science.
Taeke de Jong, building engineer

Defence

"The commercialisation of science leads to abuse. Truth is now for sale, and this is not how it should be. There is no copyright on the truth.
The internet was invented by universities, so why should we now have to pay publishers? We can disseminate truth free of charge via websites.
And are the peers who review the articles to be trusted? You just don't know. Personally speaking, I am not impressed. It is better to have open discussions about articles. You can do this via the internet. Discussions are lacking in journals, there is no debate.
Moreover, journal publishers are very slow, and as they sometimes have trouble filling their pages, they pad them out with phantom articles: recapitulations containing endless citations from others."

Soundbites

"In the event of such extreme storms, dikes breach at numerous locations. If you wait until then to evacuate, it will be too late. Because then everyone will want to get away. How many people live in the Randstad conurbation, 7 million? There you are, caught up in a traffic jam, and the water is approaching. Would you want to stay there all night, up to your waist in water, at a temperature of 4 degrees, with a child on your arm?' […] It's best to quickly move to a higher spot."
Hydraulic engineer Dr Olivier Hoes in newspaper AD in connection with the computer model he co-developed to show how flooding occurs in the Netherlands.

"And if you look at what happens in the rest of the world, such as the Japanese tsunami, and the floods in Thailand, New Orleans or New York, it is naïve to think it won't happen here."
Bas Jonkman, Professor of Integrated Hydraulic Engineering in NRC Handelsblad.

"In the long term, the economy can only grow if more people are in employment or by generating more added value per hour, more productivity. If you obstruct that, then you're just asking for a continuously tight labour market. That is ultimately unsustainable. No wage restraint policy can prevent that."
Alfred Kleinknecht, Professor of Safety Science and Disaster Abatement in Het Parool.

If the Netherlands wants to grow into an innovation economy, the culture has to change from targeting good enough to best achievable.

Jeroen Zaal, materials engineer

No to demolition - Yes to schools

Deprived neighbourhoods don't have to disappear if Maarten van Ham, Professor of Urban Development, has anything to say about it. "There will always be poverty and poor people have to live somewhere too."

Maarten van Ham received a lot of media attention after delivering his inaugural speech in December 2012. His message: it doesn't matter that poor people live with poor people and the rich live with the rich. As far as Van Ham is concerned, the government should stop demolishing cheaper homes to replace them with expensive ones, and tackle the actual poverty.
According to Van Ham, people don't even want to live in a mixed living environment, they prefer to be surrounded by 'like-minded people'. There will consequently always be neighbourhoods with relatively large concentrations of poor people. "It is impossible and indeed unnecessary to permanently oppose segregation. Mixing people would require constant intervention from the government, because 'unmixing' seems to be a natural given. So studies reveal."
Furthermore, Van Ham continues, there will always be poverty. "Poor people have to live somewhere too. Mixed living won't help combat poverty and towns need cheaper neighbourhoods. The government has an important task in ensuring that every neighbourhood is clean and safe and that there are adequate and easily accessible amenities. Stop all that levelling out, taking money from the rich to give to the poor. Try investing in the future. A far better way of helping people in deprived situations is by providing good education. In terms of investments in education, the Netherlands is lagging far behind."
So is it all a matter of what the government invests in? "No, it also reflects consumer mentality in general. They perhaps have no choice, but in countries like the United States and the United Kingdom, citizens take far more initiative without pressure from the government. In the Netherlands we have a strong tendency to make everything the government's responsibility. I think the government should step back regarding the manipulability of neighbourhoods. The manipulability concept is unsustainable, people are free souls."
The government's prime challenge, in Van Ham's opinion, is to take the edge off the market processes in the housing market. Anyone who thinks the VVD (Dutch Liberal Party) is right up Van Ham's street, is mistaken. He sees absolutely nothing in that party's proposal to introduce purchase options for social tenants. That would enable sitting tenants to buy their social property. "The same thing happened in Great Britain. There, only the better houses in the better locations were sold. It made the neighbourhoods more difficult to manage, concentrations formed of real poverty in places where this was not wanted and there was a shortage of social housing. Social housing really did become the drain.
We shouldn't want that here, that's doesn't rhyme with the Netherlands." **(SB)**

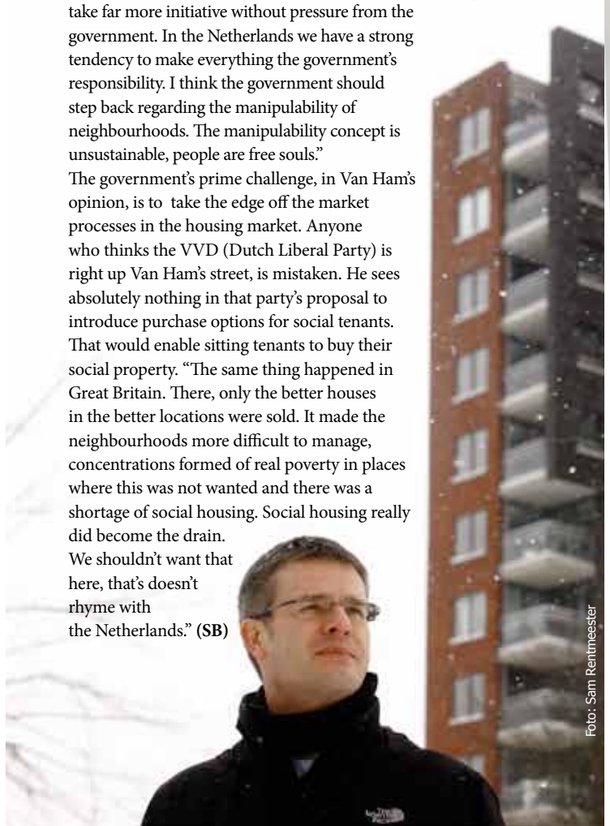
Foto: Sam Rentmeester

Money for Groningen

Now reports have revealed that the frequency and intensity of earthquakes in the gas fields of Noordoost-Groningen will increase, compensation has been promised. What is at stake?

Gas mining has increased from 20 billion cubic metres natural gas in 2000 to 47 billion cubic metres in 2012 (income for the Treasury: 11.5 billion euro). Simultaneously, the number of earthquakes in the area rose from 4 to 28 a year and intensity increased significantly to 3.9 on the Richter scale in August 2012. Last month the NAM (Netherlands oil and gas company) acknowledged responsibility and agreed to reserve 100 million euros. Groningen demanded that one billion euros be reserved. Is it time to break with trend?
Professor of Geophysics and former rector, Prof. Jacob Fokkema (Applied Sciences), puts pen to paper and says: "It is very simple. Beneath the strata of the Earth´s crust are porous layers. This is where the gas is, under high pressure, but it is recovered and sold. The rock consequently loses its strength, causing it to subside slightly. That in itself is not a problem.
At the edge of the reservoir however, are different strata, between which tension builds up. At a given point in time, this is suddenly released as an earthquake, the scale of which depends on the size of the area that moved. That´s all it is."
He won´t risk making a prediction, but he does know: "As long as you keep mining gas, you will keep removing the pressure from rocks and irritating the Earth´s crust."
TV cameras zoom in on cracks in walls, but professor emeritus of safety science Ben Ale (Technology, Policy and Management), has identified an entirely different problem: "One hundred million is for earthquakes but the risk to dikes is also considerable. The earthquakes are causing them to subside. Amazing how a minister can warn that the greatest risk the Netherlands faces is flooding and then, just two days later, make light of the fact the dykes are subsiding as a result of the gas mining. As regards compensating the damage, damage to houses would remain within reasonable boundaries. The damage to the dikes would be cause for much greater concern, however."
The National Mines Inspectorate report states that halving the production would also reduce the risk of a more powerful quake (force 3.9 or more) by half. The risk would be reduced, but not removed. It would only be reduced to a minimum if production was cut to a quarter of the current volume(to 12 billion cubic metres/year). Such a reduction is beyond discussion so money is reserved for compensation.
Safety expert Dr Coen van Gulijk (TPM) responds: "Now it has been decided not to stop the gas mining, and the KNMI says that more powerful earthquakes can be expected, further research into the risks should be conducted. Risk prediction models should be used to gauge the consequences for houses and dykes in the area. Risk analysis will offer insight into what the money can best be spent on: improving the seismic performance of houses, buying people out, compensating residents for unsellable homes or reinforcing the sea dike."
Such an assessment should also establish what would be a realistic compensatory sum: 100 million, a billion, or possibly even more. **(JW)**

It is her duty to closely monitor the day-to-day functioning of TU Delft; **Laetitia Smits van Oyen**, MBA has been appointed member of TU Delft's Supervisory Board. She graduated from the Faculty of Architecture in 1984 and spent the next 25 years working as an independent entrepreneur and for organisations. Ms Smits van Oyen will succeed Merel van Vroonhoven.

She has been advocating it for years: take emotions seriously in decision-making processes regarding high-risk technology. Professor of philosophy **Sabine Roeser** held her inaugural address on Friday, 8 February. Her hypothesis: emotions bring important moral viewpoints and moral positions to the surface.

The European Union has awarded a Marie Curie scholarship to **Dr Phil Vardon**, assistant professor of geosciences (CEG). Vardon will receive a hundred thousand euros to research the long-term effects of climate change on the geotechnical infrastructure.

The underground ecosystem can prove useful during numerous socially relevant activities, professor **Timo Heimovaara** stated during his inaugural address on 1 February. The professor of geo-environmental technology conducts research into ways to utilise biological processes underground for geo-technical and civil engineering applications, among others.

TU Delft has a foot in the government's doorway. As of 1 January professor of process & energy systems engineering **Margot Weijnen** (TPM) has been appointed member of the Scientific Council for Government Policy [Wetenschappelijke Raad voor het Regeringsbeleid]. The appointment will run until 31 December 2017.

NWO has awarded a Vici grant of 1.5 million euros to Dr **Eelco Visser**. He is currently researching programming languages at the Faculty of Electrical Engineering, Mathematics and Computer Science. With the Vici project 'The Language Designer's Workbench' Visser hopes to enable computer language developers to detect any reference errors at an early stage.

During the Dies Natalis ceremony, TU Delft presented an honorary doctorate to Professor **Avelino Corma** of the Spanish Instituto de Tecnologia Quimica. The Spaniard specialises in heterogeneous catalysis, a form of catalysis widely used in the chemical and petrochemical industries.

'Out of nothing' is the theme that **Spinvis** has chosen as new cultural professor. He was inspired by the work of the French postman Ferdinand Cheval who, in 33 years, built an entire palace of the materials he found on his daily postal round. Spinvis will deliver his inaugural address on 15 March; on 7 June, together with his students, he will present the result of his master class.

Anything from reporting loose cycle path paving to submitting online tax declarations; information technology can lead to improved government services. This is the theme of research conducted by Prof. **Marijn Janssen** of the Faculty of Technology, Policy and Management. The Executive Board has appointed him Antoni van Leeuwenhoek professor.
Prof. **Ronald Hanson** (1976), of the Kavli Institute for Nanoscience, has also been appointed Antoni van Leeuwenhoek professor. Another reason to celebrate: the researcher specialising in quantum effects is third on the list of most frequently quoted Dutch scientists recently published by the newspaper de Volkskrant.

Making money out of freezing


Photo: Sam Rentmeester

The entrepreneurial spirit that won Geert-Jan Witkamp the Entrepreneurial Scientist Award is unlikely to make him rich. The company EFCseparations, where he is chief technology officer, is owned by TU Delft. An ideal situation for the professor of process equipment, because now he can spend plenty of time on his research.

It is not very inviting: the building of Mechanical Engineering for Process Technology, which looks more like an inverted bathtub. At the door a half-frozen smoker, just inside an empty hall. "It's easiest if you ring when you get here", Witkamp had written in his mail. After that telephone call, wearing coats and rucksacks, we go into the lab, where the four staff members of EFCseparations spend much of their time.
The scientist who won the prestigious Dow Energy Award in 2011, who conducted ground-breaking research that led to several spin-off companies, and who in December 2012 received the Entrepreneurial Scientist Award from incubator YesDelft and the TU Valorisation Centre turns out to be a modest man who talks about his profession with passion. We stop at a test setup of Witkamp´s most important work, a crystalliser used for the energy-efficient purification of industrial freezing solutions, or eutectic freeze crystallization. This technology proved to work so well that Witkamp set up EFCseparations in 2009. TU Delft is the owner, the Valorisation Centre takes care of the management, and Witkamp is the CTO (chief technology officer). This means that he can work on the fundamental aspects, although this is by no means always lab work. "I do a great deal with regard to acquisitions, recruit staff, seek to create value. I see myself as an entrepreneur."

'Families depend on this company'

2013 will be an important year for EFC. "We hope to find a launching customer this year for a large installation. Until now, companies have only ordered test equipment or have us perform the testing. Luckily we have the TU behind us so we have more staying power than an 'ordinary' company."
All the research projects relating to eutectic freezing have involved a total sum of seven million euros, money from the business community. Large investments were needed for installations, one of which can be hoisted onto a truck so it can go to companies to purify industrial waste water.
The company employs four people and plans to employ two more in the foreseeable future. "Families depend on this company, Witkamp says, not without pride.
It doesn't bother the man with twenty patents to his name in the slightest that his company hasn't yet made a huge profit. "We do break even now, in terms of out-of-pocket expenses, that is, and not those 7 million. In that case we have a positive balance of ten thousand euros." That amount could increase very quickly if they could secure that large customer. **(SB)**

Name: Jan-Paul van Staalduinen (32)
Town : Den Hoorn
Marital status: Single
Position: Alderman Economic Affairs municipality of Midden-Delfland
Part-time job: Volunteer trainer and steering group member with the Haya van Somerenstichting, the VVD's training institute
Working week: 50 to 60 hours
Salary: 5553 euro gross in the case of a full-time appointment

Van Staalduinen opted for SEPAM, specialising in ICT, and graduated in 2004. He got a job straight away at the TU Delft as an ICT jack-of-all-trades in relation to teaching and with the Department for Technical Support (DTO).
After eighteen months he became a consultant with ICT company Unisys. But: "After five months I suddenly resigned. They kept pushing me more and more towards programming, that's not what I was brought in for."
Until Van Staalduinen was appointed ICT strategy consultant with Verdonk, Klooster and Associates in May 2006, he had an abundance of time for the election campaign. That was lucky as he had just been made party leader for the VVD (Dutch Liberal Party) in the municipality of Midden-Delfland. Not bad for someone who had only joined the VVD in 2003.
"When general elections were set in 2006 and our party leader was planning to move house, the party asked me to be her successor. I said 'yes' the next day."
So there I stood, totally inexperienced, facing party leaders with years of experience. "During a few debates I took several knocks. Politics is a skill in itself. It takes practice and insight."
Besides politics, his 'day-to-day life' went on as usual. At Verdonk, Klooster and n Associates, Van Staalduinen really was 'thrown in at the deep end'. "I've been to all the ministries and many universities, doing policy-related and advisory work. Extremely educational." In 2008 he happened to be at TU Delft. "When I walked into the room of my thesis professor, the first thing he said was: 'Do you fancy a PhD position?'. Several meetings later it was clear to me that I would feel most at home in systems engineering, because I wanted to do something with gaming in education."
That vague definition meant Van Staalduinen often had to fend for himself during the first year. "I regularly asked myself: what the hell am I doing? I didn't know where to start, but after eighteen months I'd got the research study up and running and I was enjoying it so much that I didn't just go to work smiling, I'd be laughing hysterically, so to speak."
Van Staalduinen obtained his PhD in October 2012 and now he is an alderman. He has plans for considerable spending cuts. "Continuing to deliver a quality service with fewer and fewer resources will be extremely challenging." He expects that everything he learned at SEPAM will be very useful. "I have been benefiting from the political management aspects of my degree programme for years." **(SB)**


Photo: Sam Rentmeester

UfD-TBI Internship Fund

The UfD-TBI Internship Fund, a collaboration between the Delft University Fund and TBI Holdings BV, makes it possible for students to fund a challenging (international) internship. TBI provides the financial resources for this.

Thanks to this fund, a growing number of students can receive a grant. The internship fund was established on 1 January 2012 for a duration of five years. During this period TBI will annually pay a sum of 13,500 euros into the fund. Applications submitted by students will be considered by the Implementation Committee of the Delft University Fund (UfD), which also decides on the award of grants. The need among students for an internship fund was confirmed by the number of applications, 37 of which were awarded. In November, the students concerned were invited to share their internship experiences and to meet TBI staff. During this well-attended meeting, it was again evident that the students very much appreciated this initiative.

edX: online free courses of MIT, Harvard and TU Delft

TU Delft is to offer courses as 'Massive Open Online Courses' (MOOCs) on edX. EdX is a non-profit platform for online education through which MIT, Harvard and others, make a range of courses accessible to anyone, anywhere in the world, who has access to internet. The free courses are open to everyone, without prior education or entry examination. In the coming academic year, TU Delft will get started on its first MOOCs: Water Treatment Engineering, Solar Energy and Introduction to Aerospace Engineering. The complete material on these courses will be posted on edX: in addition to video recordings, course material and trial examinations. MOOCs will be taught just like courses on the campus: in a fixed period of eight weeks and with opportunities for interaction between fellow participants. The modules come with homework and a certificate of participation may be issued by the DelftX on completion. EdX recently announced that MIT-professor and TU Delft alumnus Walter Lewin will also be adding a course.

Already courses like Quantum Mechanics, Introduction of Computer Sciences and Programming and Artificial Intelligence are available on **edX. www.edx.org.**

TU Delft alumni in 107 countries – World of Alumni

Since 2010 the alumni website has included the 'World of Alumni'. This is an interactive map of the world, clearly indicating where all the TU Delft alumni are. The map currently shows some 40,000 alumni, spread all over the world. Shown per country and per degree programme. In addition, nearly 350 alumni have registered as contact person. Because they'd like to stay in contact with fellow alumni. Or because they'd like to help other students.

Top 10 countries with the most alumni

Country	Alumni
The Netherlands	36184
United States of America	440
Belgium	429
Germany	267
Great Britain	262
Indonesia	218
France	200
Switzerland	146
Canada	97
Spain	96

However, alumni can be found in practically every corner of the globe, in 107 different countries.
If you would like to know more about where the TU Delft alumni are or you would like to be a contact person, visit www.worldofalumni.tudelft.nl.

Teacher training programmes in computer sciences, mathematics, physics and chemistry

Can you get excited about explaining technology to someone? Do you enjoy working with young people and would you consider it a challenge to introduce them to science and technology? Then perhaps you'd like to become a teacher and teach one of the sciences. The Master's programme Science Education and Communication (teacher training programme) leads to a qualification to teach in upper secondary education.
www.tulo.tudelft.nl , info-sec@tudelft.nl or come to the Master Event on 25 April.

50 years RID

This year, during a week of festivities in April, the Reactor Institute Delft celebrates the 50th anniversary of the Hoger Onderwijs Reactor. Part of this celebration is an open day for relations and alumni of the Reactor Institute Delft. This day is all about highlights from the past, present and future. If you completed your MSc or PhD project at the Reactor Institute Delft, please take a minute to mark this afternoon and evening in your diary. More information can be found on **www.rid.tudelft.nl/50Highlights**

'Recognition for your work'

In 2010 Vera Kreuwels (Architecture) won second prize in the UfD-Strukton Master Awards, which rewards graduation projects based on their ability to empathise, sense of initiative, innovativeness and CO_2 reduction. She researched the possibilities of planning sustainable temporary accommodation in the form of tent villages.


Photo: Vera Kreuwels

Vera Kreuwels in Haiti.

The idea was conceived while setting up the site for the First-Year Introduction Week (Owee). Kreuwels realised that the temporary tent constructions being erected there were not sustainable but did have the potential for longer term sustainable use. From temporary settlements, such as those in slums and disaster areas, she arrived at the more urban problem of the homeless in Seattle. Kreuwels was surprised to be one of the winners: "My graduation project had nothing whatsoever to do with civil building engineering, Strukton's field; it was about social sustainability. This proved to appeal to the jury."
Immediately after graduating Kreuwels was offered a position with Cordaid in the natural disaster struck Haiti. She would emigrate for six months. The UfD-Strukton Master Award carried a prize of 2,500 euros, which was very useful. Kreuwels: "As I had a job and didn't have to set up my own business, I was able to invest the prize money in a new computer and camera. That would come in very handy in Haiti."

Neighbourhood improvement
With Cordaid, Kreuwels worked on the earthquake reconstruction programme as urban planner. She soon noticed that the disaster had worsened the problems in Haiti, especially in the slums. Besides new houses, the residents wanted neighbourhood improvement. She was involved in urban planning, elementary infrastructure, permanent tailored housing and sanitation facilities.
After eighteen months, she had finished her work with Cordaid. Kreuwels didn't think twice when fellow organisation Care offered her a similar position as Program Manager Neighbourhoods, once again in Haïti. Kreuwels: "I went for six months. We're now two years on and I'm happy to go back."
Kreuwels is still pleased she submitted her thesis for the UfD-Strukton Master Award. "Not all the lecturers appreciated the scope I chose for my graduation project. Now it is clear that people do recognise and appreciate my work, both in the academic world and in the business community. So if you take a chance that doesn't pay off straight away, it could still prove fruitful later. The nice thing about awarding prizes from the University Fund is that it spotlights students for their achievements. The award also looks very good on my résumé. I operate in an international context and our university is highly valued here, also by people from MIT and Berkeley. An UfD-Strukton Master Award second laureate goes down very well with all Americans."

Would you like to support TU students? Please contribute as a 'Friend of TU Delft', universiteitsfonds.tudelft.nl.

Alumni Activity Calendar

Details of a wide range of alumni activities organised by TU Delft, the student societies and the faculties can be found on the website www.alumni.tudelft.nl. Below is a list of forthcoming events:
- 21 March 2013: IDEA League Paris
- 23 March 2013: Alumni Day Mechanical Engineering
- 27 – 28 March 2013: IDE Masterclass Contextmapping
- 25 April 2013: Master Event TU Delft
- 26 April 2013: Reactor Institute Delft Alumni meeting
- 4+5 April 2013: Open days for TU Delft BSc Programmes

MKB Meet & Greet

Our research and experience at the TU Delft Career Centre shows that students prefer working in dynamic, entrepreneurial organisations and are looking to launch their career with an SME. However, getting to know this sector and its opportunities proves to be challenging. Reason for us to organise the 'SME Meet & Greet' allowing you to present your organisation to our students, PhDs, and recent alumni in an informal setting. We also offer an exclusive workshop on hiring international talents who increasingly are part of our student body. For more information please visit tudelftcareercentre.nl/meetandgreet.
tudelftcareercentre.nl/meetandgreet

More alumni news at alumni.tudelft.nl

Colofon

Alumni portal
www.alumniportal.tudelft.nl
Changes of address
Subscribe or unsubscribe
- e-mail newsletter
- alumni events

Join our LinkedIn group TU Delft Alumni

Register with the Delft University of Technology Alumni group

Friends of TU Delft
Become a 'Friend of TU Delft' and support Talent, Technology and TU Delft with your contribution.
Account number: 22 68 50 471
Stichting UfD, mentioning "Friends"
universiteitsfonds.tudelft.nl

Questions or suggestions?
Alumnibureau@tudelft.nl
(015) 2789111

who & where

Delft University of Technology has eight faculties, each of which is engaged in education and research in one or more disciplines. The University was founded in 1842 by King William II. With 13,000 students, 2,800 scientific staff members and 2,000 technical and administrative employees, it is the largest university of technology in The Netherlands.

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telefax +31-15 278 6522

Disciplines

Aerospace Engineering
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nl-2629 HS Delft
Telephone +31 15 278 2058

Applied Earth Sciences
Mijnbouwst raat 120
nl-2628 RX Delft
Telephone +31 15 278 1423

Applied Physics
Lorentzweg 1
nl-2628 CJ Delft
Telephone +31 15 278 7774

Architecture
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Telephone +31 15 278 4184

Chemical Technology & Bioprocess Technology
Julianalaan 136
nl-2628 BL Delft
Telephone +31 15 278 2667

Civil Engineering
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electrical engineering
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Geodetic Engineering
Kluyverweg 1
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Industrial Design Engineering
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Life Science & Technology
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Telephone +31 15 278 8271

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Materials Science
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Computer Science
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Telephone +31 15 278 4568

Applied Mathematics
Mekelweg 4
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Telephone +31 15 278 4568

Technology, Policy & Management
Jaffalaan 5
nl-2628 BX Delft
Telephone +31 15 278 7100

Multidisciplinary Centres

Adhesion Institute
Kluyverweg 1
nl-2629 HS Delft
Telephone +31 15 278 5353

Biotechnological Sciences Delft Leiden (bsdl)
Julianalaan 67
nl-2628 BC Delft
Telephone +31 15 278 5140/2342

Centre for International Co-operation and Appropriate Technology (cicat)
Mekelweg 2
nl-2628 CD Delft
Telephone +31 15 278 3612

Centre for Transportation Engineering
Stevinweg 1
nl-2628 CN Delft
Telephone +31 15 278 6634

Dutch Institute of Systems & Control (DISC)
Mekelweg 2
nl-2628 CD Delft
Telephone +31 15 278 7884

Koiter Institute Delft (Institute for Engineering Mechanics)
Kluyverweg 1
nl-2629 HS Delft
Telephone +31 15 278 5460

Netherlands Institute for Metals Research (NIMR)
Mekelweg 2
nl-2628 CD Delft
Telephone +31 15 278 2535
Fax +31 15 278 2591

Wind Energy Research Group
Kluyverweg 1
nl-2629 HS Delft
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Reactor Institute Delft
Mekelweg 15
nl-2629 JB Delft
Telephone +31 15 278 5052

OTB Research Institute for Housing, Urban and Mobility Studies
Jaffalaan 9
nl-2628 BX Delft
Telephone +31 15 278 3005

Open Building Working group (obom)
Berlageweg 1
nl-2628 CR Delft
Telephone +31 15 278 5400

Delft Institute for Microelectronics and Submicron-technology (dimes)
Feldmannweg 17
nl-2628 CT Delft
Telephone +31 15 278 3868

Interduct Delft University Clean Technology Institute
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nl-2628 AL Delft
Telephone +31 15 278 7233

J.M. Burgerscentrum Centre for Fluid Mechanics
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nl-2628 CD Delft
Telephone +31 15 278 3216

Netherlands Schools for Advanced Studies in Construction
Stevinweg 1
nl-2628 CN Delft
Telephone +31 15 278 3332

Advanced School for Computing & Imaging
Mekelweg 4
nl-2628 CD Delft
Telephone +31 15 278 8032

Trail Research School
Kluyverweg 4
p.o. box 5017
nl- 2629 HT Delft
Telephone +31 15 278 6046

Central Library

Delft University of Technology Library (dutl) supplies information and provides services, particularly in the area of the technical sciences.
It comprises a central library and twelve sub-faculty libraries housed at the respective sub-faculties and institutes.
The dutl is intended for students and staff at the Delft University of Technology. However, as the task of the library is to provide scientific and technical information at a national level, its facilities are also available to the general public. As well as all areas of technology and natural sciences, the library also contains a general collection in the social sciences, economics etc.
This relates not only to books or periodicals, but also to standards, reports, reference works and congress proceedings.
Literature not in the collection or not on hand can be obtained through Delft University's Central Library from other libraries in the Netherlands or abroad.

For further information:
Delft University Central Library
Prometheusplein 1
p.o. box 98
nl-2600 MG Delft
Telephone +31 15 278 5678

Delft University Press
IOS Press
Nieuwe Hemweg 6B
nl-1013 bg Amsterdam
www.iospress.nl
Telephone +31 20 688 33 55
Fax +31 20 620 34 19
E-mail order@iospress.nl

Information

General information:
Information office
p.o. box 5
nl-2600 AA Delft
Telephone +31 15 278 5404

Information on facilities for foreign students:
Student Advisory Office
Jaffalaan 9a
nl-2628 BX Delft
Telephone +31 15 278 4670

Liaison between business and research:
Liaison Office
Mekelweg 2
nl-2628 BX Delft
Telephone +31 15 278 1500

Information on research fellowships:
Mrs. M.Y.M. Spiekerman-Middelplaats
Stevinweg 1
nl-2628 CN Delft
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General information on university education in the Netherlands:
Min. of Education, Science & Culture
Central Information Dpt.
p.o. box 16375
nl-2500 BJ Den Haag
Telephone +31 70 412 3456

(Post Graduate) Courses

Delft TopTech
(vocational courses)
Mekelweg 2
p.o. box 612
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Fax +31 15 278 1009
www.delft-toptech.nl

Institute for Biotechnology Studies Delft Leiden (bsdl)
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For information on courses in the Dutch language:
Language Laboratory
Jaffalaan 5
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