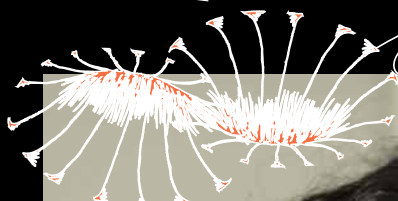
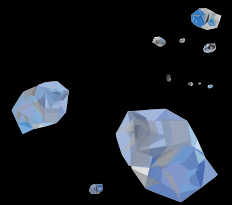
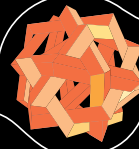


# UNIVERSITY OF TWENTE.

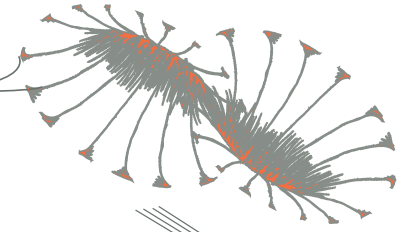
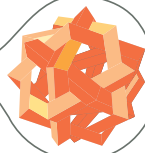


**SOCIAL SKILLS FOR ROBOTS**  
robotics dossier

**SOCIAL MEDIA AS A GOLDMINE**  
doctoral research consisting of 100,000 profiles

**TED TALK TWENTE**

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ONLINE VERSION Interested in the stories behind the interviewees, want to watch video footage or learn more about our facilities? Check the online content on: [www.utwente.nl/touch/magazine](http://www.utwente.nl/touch/magazine)



## CREATIVITY AND DARING

Moving from a creative firm that realizes landmark projects on a global scale to a university isn't the giant leap some people might think. As Managing Director at OMA, founded by Rem Koolhaas 40 years ago, I had the privilege of managing the very best in creative talent. Our mission was defined by ambition: "Be the most innovative creative company in the world". My position in this company led me to become a standard bearer for the top sector within the creative industry.

My passion for innovation and creativity springs from my firm conviction that you have to constantly re-invent yourself and your business in order to remain relevant. The act of creation entails making something that has never existed before. Perhaps we don't take enough time to stop and realize just how special this is. This year's Dies Natalis lecture by Professor Bram Nauta brought this message home. His profession, too, can be viewed in terms of architecture, albeit on the micro and nano scale. He and his colleagues are at the international forefront in finding creative mobile internet solutions. In the literal sense, his work is far less visible

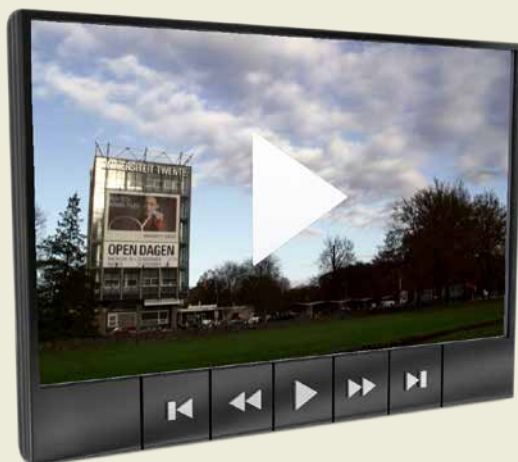
than OMA's projects, but their influence on how we live our lives today is just as great. In my view, his work proves that scientists, too, possess the mental attitude necessary to achieve true innovation. A state of mind that means you are willing to take risks and fall flat on your face every now and then. To travel down a road that turns out to be a dead end. This mentality is far from commonplace. Here in the Netherlands, we have a deep-seated aversion to taking risks. In the US, starting up ten projects and having two become a runaway success is guaranteed to get you a thumbs-up. But here in the Netherlands, we tend to stare mournfully at the other eight and in the process we risk denying ourselves the chance to truly excel. I believe the University of Twente is brimming with the potential to prove that such excellence is within our reach. For proof, we need look no further than the example I have just mentioned. I hope to be able to provide the right conditions for tapping into that potential and exploring new possibilities: to facilitate those scientists and students who dare to take the risk.



"BE THE MOST INNOVATIVE CREATIVE COMPANY IN THE WORLD"



**VICTOR VAN DER CHIJS, LL.M.,**  
CHAIRMAN OF THE UNIVERSITY OF TWENTE  
EXECUTIVE BOARD SINCE OCTOBER 2013.





# 'SOCIAL SKILLS'

Countless questions are being raised now that robots are not only working in sealed-off factories, but are also appearing in our own environment. What significance could they really have for us? Will they resemble us and will we be able to communicate with them? These are important questions for robotics research at the UT. BY: **Wiebe van der Veen**, PHOTOGRAPHY: **KEES BENNEMA**

*"We have put a lot of effort into creating a robot head that moves naturally"*

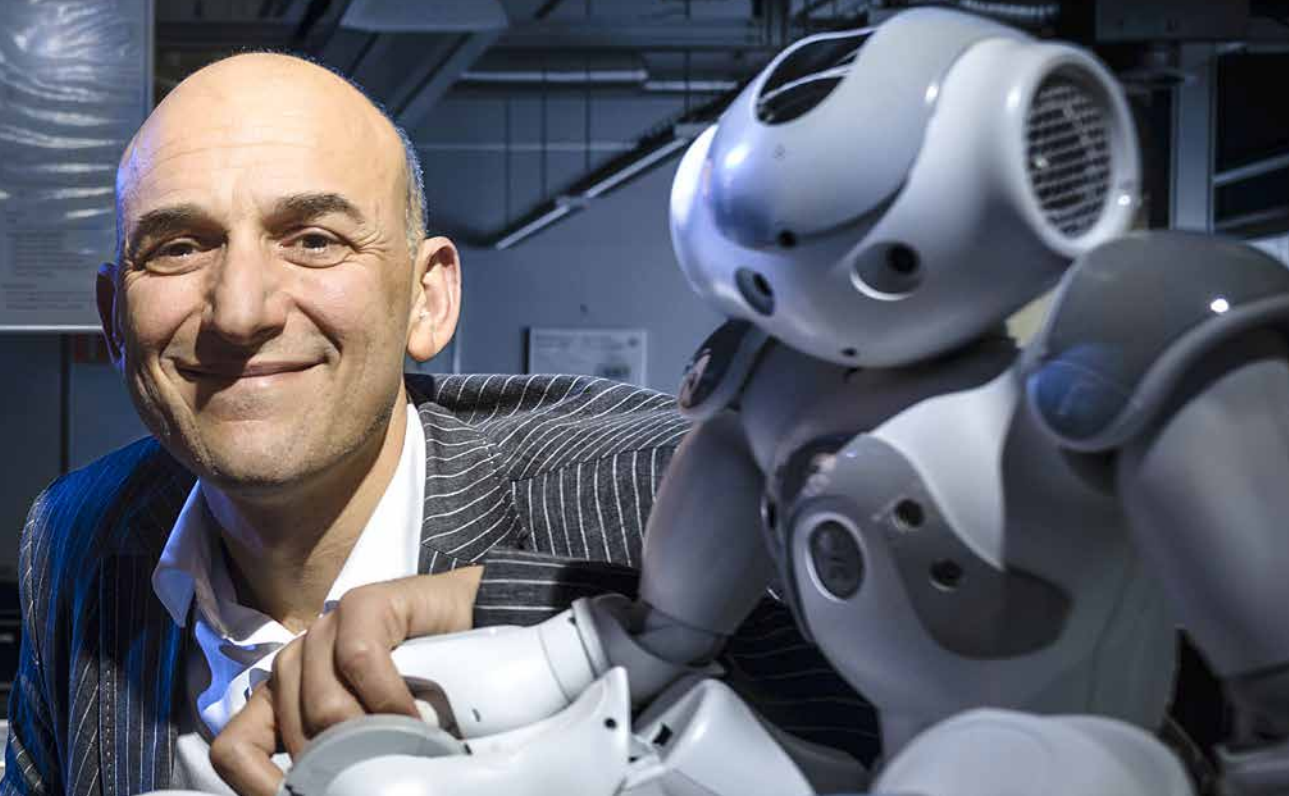
A robot who wanders around our living room as a sort of companion, who pours us a cup of coffee and cares for us if necessary: have we finally reached this phase? This is the question being put to robotics researchers all the time. We still envisage a robot as having a humanoid form, and though it may move and walk rather mechanically, we see it as a type of companion to humans. Science fiction and games have served to strengthen this image over the years. And 'humanoids', human-like robots, do already exist, some of them even

with a whole range of human facial expressions and patterns of movement.

### **Spine-chilling authenticity**

Creating just such a humanoid was once Professor Stefano Stramigioli's ultimate objective. "For example, we have put a lot of effort into creating a robot head that moves naturally. The human neck is amazingly flexible. To get a robot's head to move just as flexibly demands clever control engineering and motors that respond rapidly. A robot head that follows you with its

# FOR ROBOTS



eyes looks so real it sends shivers down your spine.” Professor Stramigioli’s group have also examined locomotor movement: how do you make it look natural, while keeping all-important energy consumption to a minimum? “This has taught us a great deal. And yet, if you look at new applications, we seem to be aiming towards less complexity rather than more. This relegates the idea of a fully fledged humanoid to the background, no matter how challenging I still feel the research questions are.”

This is endorsed by his colleague, Professor Vanessa Evers: “You sometimes read about a robot in the home, taking the place of a homecare worker, but what image does this conjure up? Till now they have been bulky machines with arms. I can’t quite see one of those cruising around my grandmother’s flat. And who knows, perhaps it is arrogant of us to think that the ideal robot should emulate the human form. For some applications an octopus’s tentacles are much more flexible and have better grasping ability.”

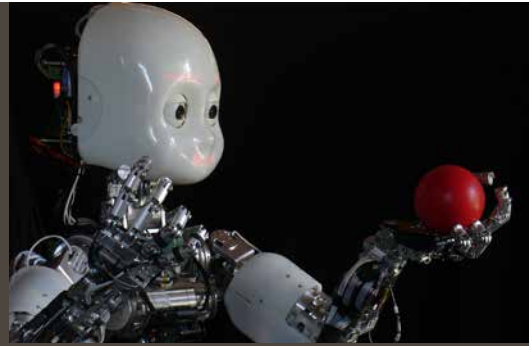
## **Social robot**

While Stefano Stramigioli, in his capacity as Professor of Robotics and Mechatronics, is specialized in control

engineering and the mechatronics of robots, Vanessa Evers focuses on the interaction between man and machine in her role as Professor of Human Media Interaction. Their respective fields of research are complementary. Professor Evers explains, “The classic method of research is to think of a solution to a problem. In our profession this is clearly changing. You sometimes see new technologies, and based on your own professional field, you think: ‘Wait, if that’s possible too, I can use it to try out something new!’ In that case, you are not solving existing problems but engaging in a type of cross-fertilization that sends you off in a different direction.” In her field she is working to create robots with social skills that can interpret people’s behaviour - or moods - and adjust their activities accordingly. “As part of a European joint venture, we are developing the Friendly Robotic Outdoor Guide, FROG, for a museum or a zoo. This is a robot that cruises around and provides visitors with appropriate information, but which also has a projector to show an image or a video. FROG gauges whether visitors are interested in him, works out the direction they are looking in and provides appropriate information. Or take the case of a passenger searching in a state of mild panic for the

## iCub

If Frank van der Velde, Professor of Technical Cognition at the Faculty of Behavioural Sciences, has his way, the newest version of the iCub robot will soon arrive at the University of Twente. The iCub is a human-like robot, a humanoid, and various European institutes have been collaborating on its development. It has hands with sensitive fingers, flexible joints and it even has facial expressions. Control engineering from Professor Stramigioli's group has already been incorporated into the iCub. The newest version, which costs about a quarter of a million euros, even has a sensitive skin. Van der Velde would like to take the iCub one step further than current possibilities allow. He wants to give the robot the cognitive processes of a human brain. "We want to ensure that the robot continues to learn and understands how people function. That will enable the robot to actually learn from mistakes: if he keeps spilling when pouring out coffee, then he can learn how it should be done." Electronic connections resembling a web of nerve cells in the human brain can form an artificial brain, a nano-neural network. Research at the UT, in which living neural



networks are cultured to study their behaviour, can also contribute to this. There are clearly many connections between Frank van der Velde's research and that of Vanessa Evers, who also likes the idea of the iCub coming to the UT: "For instance, we would like to test whether children can teach a robot certain tasks. Not by using computer language, but through their behaviour. The robot learns from the responses of a child whether what it is doing is right or wrong: from an approving glance, a shake of the head or a clear sign of disapproval, for example. At the same time, the child will learn to communicate with the robot through play."



"In the near future a robot will cruise around the UT campus, interacting with students and visitors"

right transfer gate at Schiphol: could a robot recognize that behaviour, help him or her and possibly offer a little reassurance?" In both cases the robot needs to possess the right sensors to start with, in order to make the necessary observations. The movements, attitude and direction of gaze it observes subsequently have to be interpreted using intelligent software. And then there is the robot's own attitude and action: should it remain at a distance for a while or 'make the first move'? The robot has to assess how to communicate with a human.

## Trust

The key is to inspire trust. Until now robots have mainly thrived in environments where people weren't allowed, while now they are emerging from their factories. For this reason Professor Evers wants to allow a robot to cruise around the UT campus in the near future, interacting with students and visitors. "If you want people to become accustomed to the idea of robots, then they will have to come into contact with them.

Otherwise you could end up fuelling anxiety and visions of robots that are capable of multiplying independently in the laboratory and taking over the world. To tell the truth, our cars are already robotized to a great extent, as well as being assembled by robots. In other words, the construction of robots by robots is already happening in practice!"

Though the idea of a robot replacing a carer in the home may seem far from realistic, many applications do exist in the health sector, both cure and care. For example, it seems that patients with dementia and children with a serious autistic disorder have a low threshold for communicating with a robot. Place a robot on their lap – one that looks like a pet, for example – and they start smiling. "Clearly, this mustn't get out of hand," Professor Evers warns. "It shouldn't be a case of giving someone this type of a robot based on the idea: now I don't have to worry about them for a couple of hours. It really is the case, however, that autistic children



Enthralled by this story and the robots of the future? Read, watch and experience more at [utwente.nl/touch/magazine](http://utwente.nl/touch/magazine)

communicate with other people more easily via a robot. The interaction is less complex and involves fewer stimuli. There is also evidence to show that a simple robot next to a child's hospital bed can make the whole experience of hospitalization less frightening."

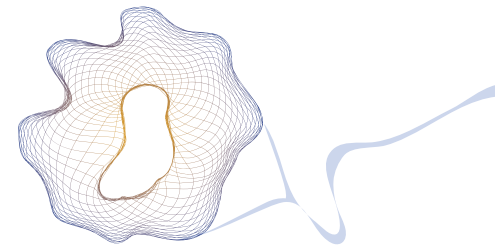
### Robot arm helps surgeons

Robots in the home, designed to monitor the resident's medicine intake or to remind them that they need to eat something, do not need to be highly complex. If it were up to Professor Stramigioli, it could all start with an "iPad on wheels". However, his group is also working at the other end of the healthcare spectrum, where robots really are complex machines: robot-controlled endoscopes and surgical robots equipped with extremely meticulous needle controls. "Robots are certainly nowhere near replacing humans in that environment, but they do offer support, e.g. for surgeons. When a brain tumour is being removed and the area for cutting is very precisely defined, a robot arm can help the surgeon remain within that area." Professor Stramigioli continues, "The current tendency is that there is little scope for doing 'crazy' research. Research is expected to result in an application within a limited number of years. In one way this is limiting our creativity. But it is also forcing us to look for new, practical robot applications. Robots can play a big role in today's society, where security is such a big issue. They could assist in police investigations. They could

also take the place of humans during high-risk inspections. For instance, in the European project PETROBOT, which is being run by Shell, we are working on robots that can inspect boilers and storage tanks." Earlier, his research group developed the Pirate robot, which can inspect gas pipelines for leaks and other irregularities. This robot, an advanced version of which has already been developed, moves along pipelines like a snake and can even manoeuvre round bends smoothly.

Flying robots can also be seen in Professor Stramigioli's lab, in the shape of quadcopters equipped with sensors and cameras: "You can send these ahead into a dangerous environment to see whether harmful gases are being released in places where victims may be located. You can also make a flying robot look like a real bird, in order to chase birds off an airport runway." And in a corner of one lab there is a converted Segway, specially designed to collect crates of beer from the supermarket: every bit as practical as the commercially available robots that mow lawns and vacuum floors. But returning to our image of robots, Professor Evers claims: "What we tend to forget is that we already live among robots. I have already mentioned our cars, but our households have become extensively robotized as well. The current challenge is to advance from robots that simply 'beep' when they have finished their job or to indicate danger, to robots that can really communicate with us."

# IN SHORT



## MOST ENTREPRENEURIAL UNIVERSITY

The University of Twente has been proclaimed the best university in the Netherlands in the field of commercial knowledge transfer: utilizing scientific knowledge to benefit society and the economy. A study by ScienceWorks and Elsevier magazine not only put the UT at the top of its rankings but also praised the UT for being "miles ahead of the rest as best entrepreneurial university".



## EXECUTIVE BOARD WELCOMES NEW CHAIRMAN

On 1 October, Victor van der Chijs was appointed the new chairman of the UT's Executive Board. Mr Van der Chijs was previously Managing Director of OMA, an authoritative firm of architects that operates throughout the world. In the past he has worked for ING and Schiphol. Victor van der Chijs succeeds Anne Flierman, who earlier this year was appointed chairman of the NVAO, the independent accreditation organization for higher education in the Netherlands and Flanders.



## PIE-THROWING RECORD BREAKERS

Students at the UT have broken the world record for throwing pies filled with shaving foam. This slapstick world record attempt took place during the Kick-In, the UT's introduction period for new students. No less than 749 people joined in the fun. To merit a mention in the Guinness Book of Records, at least 714 participants had to throw shaving-foam pies at each other for at least one minute.



**Countries with the most UT alumni: Germany, the United States, the United Kingdom, Belgium, China, Switzerland, Indonesia, France, Spain and Sweden.**



# UF **twente university fund foundation**

## FIRST CONTRIBUTORS' DAY

The first Contributors' Day was recently held to thank those who contribute to the Twente University Fund for their financial support in recent years and to show them the activities and projects they have made possible. The guests were welcomed by a distinguished delegation that included the Chair of the Executive Board and the Rector Magnificus of the UT. The Twente University Fund finances top-level research, awards scholarships, and funds a range of important activities, such as international study trips, congresses and symposia. The Contributors' Day was an enormous success and will be organized on an annual basis from now on.

In **2013** the Twente University Fund spent **€478.000** on its targets: **campus and student life, endowed chairs, international study trips and scholarships.**

# 3

PLACE



## THIRD PLACE FOR SOLAR TEAM TWENTE

Solar Team Twente took third place during this year's World Solar Challenge in Australia: their best result to date! The team completed the race, a distance of 3,000 kilometres through Australia's rugged landscape, in just 37 hours and 37 minutes. Students from the University of Twente and Saxion had put their studies on hold for one-and-a-half years in order to develop, build and test their solar-powered car, and to see it safely through the trials of the Australian race.



## BATA4LIFE

In 2013, fundraisers Bata4life collected almost €10,000 for the Dutch Cancer Society (KWF) with activities surrounding the Batavieren Race. It's the world's biggest relay race, starting in Nijmegen and ending on the University of Twente campus. All of the participants were encouraged to attract sponsors, with the proceeds of the campaign going to scientific cancer research. The idea behind the campaign is simple: the more we know about the development and treatment of cancer, the more lives we will be able to save. Bata4life will be raising money for KWF again this year.

**Bata4life collects almost**  
**10.000 euros**  
**for the Dutch Cancer**  
**Society (KWF).**

“The computer’s estimate is slightly more accurate than a human assessment.”



The language a person uses says a lot about their identity, but in the past, researching identity based on language usage was always very difficult, says Dong Nguyen, PhD candidate at the UT Centre for Telematics and Information Technology (CTIT): “In the past, you simply didn’t have the right data to answer many research questions. You had to interview people or observe them. Not only was this labour-intensive, but once people knew they were being watched, they could adjust the language they used, thereby interfering with the results.”

The emergence of social media is opening new doors for research into language use. For instance, Twitter

has suddenly provided access to an enormous reservoir of messages that stretches over a period of several years. Social media can therefore be a gold mine for scientists in the fields of culture and language. However, the enormous amount of data that are suddenly available makes it impossible to read and analyse everything. This is why Nguyen, originally an information specialist, is researching how you can deploy computers to analyse automated messages: research at the interface of computer science, linguistics and ethnology.

#### **Fables and rumours**

Nguyen explains, “I am interested in how we can learn more about

our culture and society based on what people are writing on social media.” She is, for example, examining how fables and rumours develop and spread. In doing so, it is extremely important to be able to automatically distinguish between different types of users. What makes her research so interesting is its multifaceted nature, says the PhD candidate. “On the one hand you are involved in something extremely technical like developing computer models, but on the other hand, you are also learning something about our society. This is why I am working together with experts from entirely different fields, such as linguists and people who are involved in culture.”



On 13 May, PhD candidate Dong Nguyen launched Tweetgenie, a computer program that can guess the age and gender of Dutch tweeters based on the language they use. Within two hours, the website was struggling to cope with the large number of people visiting the site. The number of profiles submitted has since passed the 100,000 mark. "This exceeded our expectations by far."

BY **Joost Bruysters** PHOTOGRAPHY **Rikkert Harink**

# TWITTER CULTURE

## **Niiiiice**

For her research, Nguyen - in collaboration with the Meertens Institute - developed the program Tweetgenie. This allows anyone to fill in the name of a tweeter and the computer will indicate how old the person is and whether they are a man or woman. To do this, the computer simply examines the use of language in the most recent 200 tweets. For example, if you use long, complex sentences, you are probably an older tweeter. If you are more likely to write 'I' and 'you' than 'we' and 'they', and your tweets contain lots of smileys and stretched-out words like niiiiice, then you are probably younger. In 85 per cent of cases, the program guesses the gender of tweeters

correctly. When estimating age, the computer is no more than four years off target on average. This already makes the computer's estimate slightly more accurate than a human assessment.

## **100,000 profiles**

Although Tweetgenie is still only a demo program, created in order to collect data, the system immediately generated an enormous amount of interest. As soon as it was launched, people were visiting the site in droves and Twitter was buzzing with tweets about Tweetgenie. All the commotion made it difficult to access the website during the first few days. Nguyen recalls, "Right away we had far more visitors than we had anticipated. We

had carried out tests for coping with large numbers of visitors, but this exceeded all our expectations." Now, several months later, over 100,000 profiles have been submitted to Tweetgenie. Although the enormous peak is now over, the site still receives plenty of visitors. All the attention the system attracted has resulted in an unimaginable quantity of data that Nguyen can use for her research. However, the doctoral candidate is not afraid of a data overload. She does worry about an excess of new ideas. "There are so many fun things I would like to do within this research. It is important that I make choices and stay focussed in order to complete my doctoral research in time."

FRANS DE JONGH WINS THE CENTRAL EDUCATION PRIZE



# WHY DO PEOPLE NEED LUNGS?

With a mini-lecture full of breath tests and opinion polls among the audience, lecturer in Technical Medicine Frans de Jongh emerged as winner of the Central Education Prize, the award for the UT's best lecturer. "Perhaps I was just lucky to be the last finalist to perform," he reflects modestly. But he had the audience hanging on his every word. "Humans – and dolphins – have lungs. But why?" **BY Berend Meijering PHOTOGRAPHY Rikkert Harink**

He once worked in aerospace engineering, and now he is a lung physiologist. All the same, it isn't difficult for Frans de Jongh to discover a common thread in his career: "Whatever I calculate: whether it's the pressure thrusting an aeroplane upwards or causing lungs to collapse, I am still focused on the same thing: aerodynamics, or fluid mechanics."

"That's why I enjoy subjecting students to my 'respiratory digressions'."

***Aeroplanes are magnificent. But is the human body even more magnificent to an engineer?***

"I should say so! Just look at our lungs – half a tennis court in surface area. How did nature manage to crumple all this up in such a way that, after the 16th branching, millions of alveoli are ready and waiting to supply our blood with

oxygen? It's because they are fractals – structures with a 'broken' dimension, in between surface area and space, which repeat themselves endlessly and which can grow exponentially. Just like clouds, water crystals and other fractals, the lungs are a miracle of efficiency. And a thing of beauty. In my mini-lecture, I was able to present the most wonderful images."

***Why do people need lungs? Single-celled organisms breathe through their skin.***

"I invite the audience to call out anything in response to such questions and I put the most sensible replies to the vote. That way you always arrive at the truth. As it turns out, the surface of our skin is too small in relation to the 'gas-exchanging surface', where oxygen is taken up by the blood and carbon dioxide is released into the atmosphere. That's why we have

lungs. However, dolphins also have lungs, no larger than ours, and they are much better divers than we are. This is thanks to the reinforcing cartilage rings which ensure that ..."

***... Dwelling on dolphins: is that something that students of Technical Medicine benefit from?***

"Yes, indeed. Nature designs and develops things so wonderfully well! By following nature's example, we can achieve the most surprising results, both diagnostic and therapeutic. That's why I enjoy subjecting students to my 'respiratory digressions'. It forces them not to accept anything without question. Although I suspect I may get a little tiresome at times."

***"He makes mathematics work for you," is what your satisfied students have to say.***



## WHO IS FRANS DE JONGH?

Dr. ir. F.H.C. de Jongh (1963) obtained his doctoral degree with a thesis on ventilation modelling of the human lung. He works as a lung physiologist with the Academic Medical Centre in Amsterdam and the Medical Spectrum Twente. He is a lecturer at the University of Twente for the programmes Mechanical Engineering, Biomedical Technology and Technical Medicine.



Without saying a word, De Jongh takes two sheets of paper between his fingers, blows on the edges and shows how they vibrate against one another. “A demonstration of Bernoulli’s law,” he explains. “The faster air moves, the lower the pressure. This also explains why people with Chronic Obstructive Pulmonary Disease, COPD, are so much worse off if they start breathing faster during shortness of breath. After all, speeding up the airflow reduces the pressure and causes some respiratory passages to collapse. This is because these passages are not healthy and rigid, but weak. As weak as paper. So these patients need to search for their ‘optimum respiration’ and that means breathing more slowly. This is unnatural for anyone who feels short of breath and it’s quite a feat for an attending physician to convince them that it’s the right thing to do.”

“Allow the laws and formulas that describe physiological processes work for you, even in health care. My students are quite right about that. Their pitfall, however, is digging too deeply into the theory. There’s no need to! Practice teaches us that it’s enough to estimate a few relevant data and use your common sense.”

*Technical Medicine has been proclaimed the ‘best medical course in the Netherlands’. You must be pleased about this, being one of its first lecturers.*

“Technical physicians know how to handle complex medical equipment. While those around them barely know how to use two or three switches, we can step in, explain what’s happening and alter the software to give the machine more useful functions and to tailor the process to the individual needs of the patient. At present, all this still

takes place under the final responsibility of the doctor. But as soon as the Council of State has approved an amendment to the Individual Healthcare Professions Act (BIG Act, Wet op de Beroepen in de Individuele Gezondheidszorg) – the last step in the legislative process – technical physicians will be able to carry out procedures on patients independently.”

“In the meantime, medical specialists are very enthusiastic about our graduates. They use technology to improve diagnoses and therapy, and they have proved to be ideal PhD candidates in all sorts of research areas – from new cancer therapy to exercise-induced asthma and sleep apnoea. When I defended my thesis, things were quite different! Technology and medicine used to be two separate worlds. Now the two are converging with increasing rapidity.”



Curious to see how Frans de Jongh stimulates his students? Watch his mini lecture at [utwente.nl/touch/magazine](https://utwente.nl/touch/magazine)

# A FAIR COOKING

**René Hol (4 August 1960)**

1981-1986 Mechanical Engineering, TH Twente  
1986-1989 Director of Company Software Development (NL) with Sorba Automatisering  
1989-2006 Management Consultancy with Ernst & Young (since 2000 Cap Gemini). Partner since 1997.  
1995 Postgraduate Management Consultant programme, VU University Amsterdam  
2006-the present Co-founder of and investor in Delphi Bioscience. Current position: Director of Asian Operations (see also: [www.delphiscreener.asia](http://www.delphiscreener.asia))

**Anouk Hol (3 July 1991)**

2009-2012 BA in Biomedical Technology  
2011-2012 Pre-Master's programme in Mechanical Engineering  
2012-the present MA in Mechanical Engineering  
2013-the present Internship with Central Group Research at Volkswagen, Wolfsburg

**Elise Hol (3 July 1991)**

2008-2012 Higher Vocational Studies in Nursing (University of Applied Sciences Utrecht)  
2012-2013 Pre-Master's programme in Health Sciences  
2013-the present MA in Health Sciences

# ROTA



Marlène Hol (6 October 1994)  
2012-the present BA in Computer Science



RENÉ HOL HAS THREE DAUGHTERS, AND ALL THREE ARE STUDYING AT THE UT. “OF THEIR OWN FREE WILL, HONEST!” HE EXCLAIMS WITH A BROAD SMILE. “I DIDN’T PUSH THEM IN ANY WAY WHATSOEVER.” MARLÈNE BACKS HIM UP ON THIS: “TECHNOLOGY IS SIMPLY IN OUR BLOOD. IT LOOKS LIKE WE’VE INHERITED OUR FATHER’S GENES. OUR MOTHER IS ‘TECHNICALLY CHALLENGED’, AND YES, SHE DOES SOMETIMES FEEL A BIT LEFT OUT. BUT MOST OF ALL SHE IS EXTREMELY PROUD THAT HER DAUGHTERS HAVE CHOSEN TO STUDY SUBJECTS THAT NOT MANY WOMEN CHOOSE.” BY Lidewey van Noord PHOTOGRAPHY Rikkert Harink

In fact, Anouk never planned to follow in her father’s footsteps. “I thought that Mechanical Engineering was really just for men. It’s not a subject women choose, I thought. But I didn’t get through the selection for Dentistry and then, via a detour, I ended up doing Mechanical Engineering after all.” She may have been frightened off somewhat by one of René’s anecdotes from his student days. Elise takes up the story: “My father had only one female housemate, all the rest were men. That one woman did the shopping and cooked every evening for the entire house.” Things are different these days, as Marlène points out: “In my student house, we all do our fair share of the cooking.”

Elise started out studying in Utrecht, but felt more at home at the UT. “Everything is more relaxed here, we have a different way of communicating with one another. Besides, the UT is the only university in the Netherlands that covers the technical side of Health Sciences.” Things often get technical when the father and his daughters get together. Anouk explains, “We often start scrutinizing something when we are out walking. For example, a cable lift with too steep an incline: that’s something we can really start arguing about.” Elise adds, “I tend to zone out at that point and start talking to my mother about our medical profession.” They can also get talking about the UT, although René still insists on calling it the ‘TH’ (which stands for Technische Hogeschool or Technical College). “When

he’s on campus, he is always talking about buildings that no longer exist,” Marlène laughs. “A lot has changed,” Anouk agrees. “For example, the old drawing tables have been replaced by modelling programs. ‘Oh dear, so many changes!’ my father sighs when he sees it all.” René notes, “There are so many more female students these days,

**“Everything we do is great in our father’s eyes”**

and foreign students too. The UT has become more dynamic. But on campus it’s as though time has stood still, in a positive sense: there are still couches out on balconies and crates of beer outside front doors.”

René is currently co-owner of a company that has developed a product that women can use to test themselves for cervical cancer, among other things. “Everything we do is great in our father’s eyes,” says Anouk. “He often wants to read our textbooks once we have finished them.” Elise’s experience was a little different: “The programme I took wasn’t really technical, so he never read my books. But now dad has started his company, he understands what I do so much better. So, in the end, he has actually ended up more in my field.”



From left to right: Wouter de Vries, Edwin Vlieg, Joost Diepenmaat, Jaap Beernink and Bas Hekman (not pictured: Raoul Werger).

“We know what it takes to turn a wild idea into your own business. (...) We want to inspire you by helping you get started at an informal get-together.” This is the invitation on StormendTalent’s website, as worded by Jaap Beernink (Spinteq, B&M Business Development), Joost Diepenmaat and Edwin Vlieg (MoneyBird), Bas Hekman (Ligman Lighting Nederland), Wouter de Vries (Antagonist, internet hosting) and Raoul Werger (Oxilion, internet hosting).

### Enthusiasm

The six initiators are mostly UT alumni; during or after their studies they started and successfully expanded their own internet businesses. They took advantage of - or experienced at close hand - the broad range of support for starting entrepreneurs available under the umbrella of Kennispark Twente. “That has been formalized by organizing meetings for starters, for example,” explains Jaap Beernink. “We, on the other hand, are an informal club that is particularly interested in getting across our enthusiasm for entrepreneurship. People can’t become a member of StormendTalent,

though we do hope that other entrepreneurs will go on to act on the experiences we share with them.”

### Your own product

The enthusiasm applies particularly to starters with the ambition to launch their own product onto the market. “For six years, I did purely consulting at B&M Business Development,” says Beernink. “We lacked the capacity for growth that we saw in our customers, potentially at least. We needed software products in order to go from strength to strength. This resulted in Spinteq, which we used to develop Idea2Venture, as well as the Golden Egg Check, for assessing new business cases.”

### Smart money

“Plenty of students start up an internet company but seldom get beyond the level of building websites for the local sports club. Our aim is to achieve national coverage at least,” says Edwin Vlieg. His colleague, Joost Diepenmaat, adds: “When someone comes up with their own product, that’s when the fun starts. In and around the UT, that often means nanotechnology





StormendTalent is not about providing aspiring entrepreneurs with a ready-made recipe for success. But it does provide pizza at a session that invites participants to present their fledgling plans. This set-up enables the bright sparks and successful internet entrepreneurs from StormendTalent to act as critical sparring partners and enthusiastic coaches.

BY Hans van Eerden PHOTOGRAPHY Eric Brinkhorst

# PIZZA SESSION AT THE BROUWHUIS

## STORMENDTALENT HELPS TRANSFORM WILD IDEAS INTO START-UPS

or medical technology; we, on the other hand, want to demonstrate the power of internet businesses.” Wouter de Vries is well aware that starters often have a technically sound idea “but they find it difficult to come up with a good business model and to be smart about making money from their work.”

### Spotify for books

The StormendTalent sessions are always hosted at the office of one of the initiators. This time the setting is the striking new premises of MoneyBird, a successful UT spin-off that helps freelancers, one-man businesses and SMEs with online quoting and invoicing. The paint is barely dry and hammer drills are still rumbling in the concrete of the Brouwhuis building, once home to Dutch beer producer Grolsch. Two aspiring entrepreneurs, who want to start their own operation while continuing to work for an internet company, present their business idea: “Spotify for books”. It’s an online subscription that offers e-books along the same lines as Spotify offers online streaming music.

### Taking pot-shots

“We hope you won’t hold back. Take pot-shots at our idea: tough, honest criticism is what we’re after. Step one is our product idea, step two is to arrive at a business model.” The people from StormendTalent fire away while they tuck into their pizza. Where will you get your books from? Will you have to offer your own e-reader? How much can you charge for a monthly subscription? How will you attract visitors to your website quickly? Will you have to develop and maintain your own apps? These are just a handful of the questions fired back at the presenters. As always, there are even more questions to be asked once the session is over.

### Inspiring

The coaching is for free, says Bas Hekman in conclusion. “Our aim is to inspire and offer eye-openers. If it leads to results, then so much the better.”



Do you have a brilliant idea or are you just starting up your own business?

• <http://stormendtalent.nl>



People with paraplegia walk thanks to exoskeleton



Name **Prof. dr. ir. Herman van der Kooij**  
 Age **43**  
 Position **Professor of Biomechanics and Rehabilitation Technology**  
 Education **Biomechanical Engineering**  
 Lab **Biomechanical Engineering**

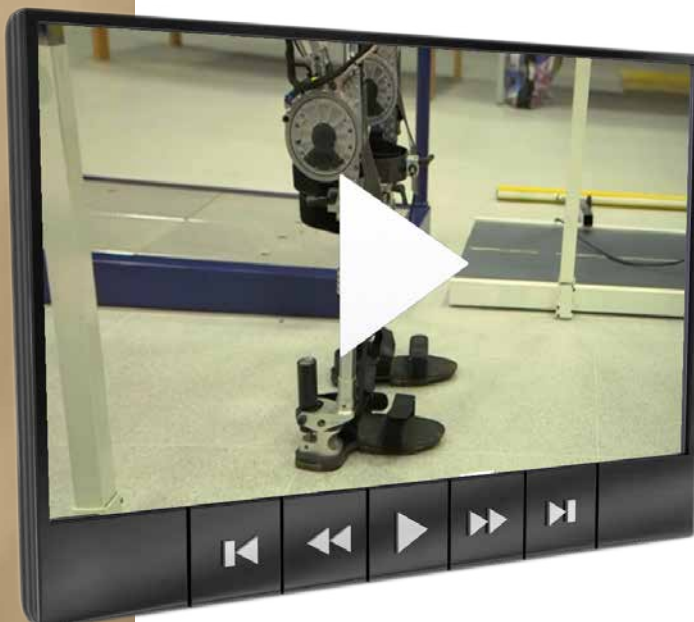
BY **Jochem Vreeman** PHOTOGRAPHY **Kees Bennema**

The sight is both spectacular and surreal. A patient whose body is enveloped in an external skeleton shifts his torso forwards at an angle and takes a step. The exoskeleton is attached around his hips and has shafts extending down both legs to below his feet. Hinged motors at his hips and knees make a walking movement possible. Clearly, it doesn't look entirely smooth, but it does enable people with complete paraplegia to take steps. They can walk again.

"This exoskeleton, which we developed in collaboration with Delft University of Technology, is part of the European Mindwalker project," says Prof Herman van der Kooij, who also works at Delft.

"The project's point of departure is that signals from the brain are used to control this type of skeleton. A patient thinks: 'I want to take a step forward' and that thought is recognized and passed on to the exoskeleton. However, there is a long delay between the intention to walk and the actual step. The amazing thing about this exoskeleton is that it is also triggered by moving the upper body. People paralysed by an injury to the lower part of the spine can move the exoskeleton by shifting their centre of gravity. This is a much more natural movement."

The exoskeleton is currently undergoing further development. The aim is to reduce its weight by at least half of the current 23 kilograms and to refine it even further.



Want to find out more about how the Lopes works? Watch the video at [utwente.nl/touch/magazine](http://utwente.nl/touch/magazine)

## ROELOF VAN ZWOL IS STILL THE SAME INQUISITIVE LAD HE USED TO BE

Having conquered America, Netflix is now trying to win over the Netherlands with its success formula: unlimited online viewing of films and TV series. The worldwide rise of this entertainment giant is partly thanks to the personalization algorithms developed by Roelof van Zwol, UT Informatics alumnus.

BY **Marco Krijnsen** PHOTOGRAPHY **Rikkert Harink**

# A CUSTOMIZED TELEVISION RECIPE



He was back for a few days, enjoying a brief respite from his home turf: Silicon Valley, the ever-beating heart of California's IT industry. His busy schedule didn't permit a short visit to Twente. With a view to obtaining a firm foothold in the Netherlands, Netflix has spent a whole week receiving the press in Amsterdam. Roelof van Zwol accompanied them to give demonstrations, but also to explain the technology that he helped to develop: the Netflix system that thinks along with users and provides them with a recipe for customized viewing.

"We provide customers with suggestions to help them make a choice from the range we offer. Titles they will almost certainly like," Roelof explains. "That is essential. Every time you watch television, you make a choice. Do you opt for live television on cable? Or do you watch a selection of your preferred films or programmes via Netflix, at a time that suits you? We call these the moments of truth. It's all about us helping customers in a smart way."

### Magical box of tricks

Roelof van Zwol has been fascinated by IT from an early age. It all started in the 1980s, with a large computer in his parents' home in Ede. For Roelof, it was a

magical box of tricks. "It was a really expensive machine that I wasn't allowed to touch. My father used it for doing computer image analyses. I was curious and wanted to know how it worked."

His interest was aroused and, once in secondary school, it was pretty much understood that Roelof would study Informatics. A school study trip, which included a visit to the University of Twente campus, was the reason why he opted for the UT. That was all it took for him to decide that this was where he would study. "The first few weeks of the programme made a deep impression on me. We started with mathematics at a really fast pace. If you couldn't keep up you had a problem. It was tough. At that time I didn't really realize just how important mathematics was. That didn't sink in until I started working for Yahoo. There, it finally dawned on me that you need a sound knowledge of mathematics in order to fully understand technology. That knowledge forms the foundation I can always rely on."

### 70 publications

While studying at the UT, Roelof found himself in Peter Apers's database group, where he became involved in geographical information systems. After graduating, he did



## FROM THE UT VIA YAHOO TO NETFLIX

Roelof van Zwol (1972) studied Informatics at the University of Twente between 1992 and 1998. He continued his studies at Twente and obtained his doctoral degree there in 2002. After a career with Yahoo, he joined Netflix as Director of Product Innovation for Search and Personalization Algorithms in 2012. Netflix has been active in the Netherlands since September 2013. For €8 a month, subscribers can watch an unlimited number of films and TV series from the Netflix catalogue. Apart from existing material (often at least two years old), Netflix also offers series of their own, such as House of Cards. Netflix has more than 37 million paying customers worldwide, most of whom live in the United States.



doctoral research into modulating and sifting through collections of multimedia documents. While fellow students couldn't get into the world of business fast enough, Roelof chose science, driven by the same curiosity that his father's big computer used to spark in him. "I am happy with my decision. I have to find the best solution to a problem. It's something that has always occupied my mind, and that's what I am currently doing for Netflix."

**"Here are the data, there are the machines. Go and have some fun."**

As a result of his thirst for scientific knowledge, Roelof has no fewer than 70 publications to his name. "Writing comes easily to me," he comments matter-of-factly. The publications and the corresponding appearances at conferences brought him international fame. By 2006, his reputation as an expert in the field of multimedia research had reached the ears of Ricardo Baeza-Yates of Yahoo. He recruited the UT doctor as head of the multimedia team of the new Yahoo research lab in Barcelona.

### Brad Pitt

"Here are the data and there are the machines. Go and have some fun. That was, roughly speaking, what Baeza-Yates asked me to do," Roelof says about his time in Spain. "We had the freedom to play around with the big data. This resulted in us developing a type of image search, where the search engine comes up with suggestions that are related to the person you are looking for. If you are looking for Brad Pitt, then you will automatically see something about Angelina Jolie, too. The module works on the basis of tags. When someone is often photographed with Brad Pitt, it indicates how important that person is in a given context. This principle is still in use. And... yes, that's something I am rather proud of."

Roelof wrote a publication about Flickr based on his research with Yahoo: Who's looking? "There I revealed, among other things, that photos on Flickr attract most views within the first 48 hours. If they are not popular at the start, they never will be. The same still applies to Facebook. Flickr had only just started when I wrote that

publication. Hardly anyone knew how the photos were being used."

### Personalization

In 2012, Roelof made the move to Netflix, the American company that focuses on the online streaming of video on demand. There he is responsible for heading a team of engineers who are working on optimizing the search engine and personalization algorithms. Their solutions help customers to separate the sheep from the goats in the database of films and TV programmes. "Personalizing that search engine is something we are good at. We've only just begun." Clearly, Roelof has remained an active researcher, the inquisitive lad he always was, who was so keen to see what was inside his father's magical computer. "I think switching from fundamental to industrial research was a good move for me. Along the way, I've discovered that the latter suits me better. University research takes a long time; you have to be looking at least ten years ahead. I want something with immediate impact."

# ALUMNI OFFICES JOIN FORCES

Since last summer, the alumni offices of the Faculty of Geo-Information, Sciences and Earth Observation (ITC) and the University of Twente have joined forces under the same umbrella. UT alumni coordinator Joe Laufer and ITC alumni coordinator Jorien Terlouw describe their view of the enormous potential of the alumni community. BY Jochem Vreeman PHOTOGRAPHY Gijs van Ouwkerk

“We work according to the same mission – external relations, transfer of knowledge and bonding – which is why collaboration is a logical step,” says ITC alumni coordinator Jorien Terlouw. She has worked for ITC since 2004 and has spent much of that time abroad. The ITC, founded in 1950 with an original focus on development cooperation, has more than 20,000 international alumni. While these alumni are often very much geared towards academic success with a view to achieving a successful career in their homeland, they also express a clear sense of pride in their ITC connections. “Although most of our alumni come from Africa or Asia, they also have what we like to call ‘Twente DNA’. It’s something all our alumni share.”

## It’s not just about happy memories

According to Joe Laufer, an alumnus with American roots, Dutch alumni have a particularly strong bond with their former sports clubs and student associations, student houses and fellow students. “This bond continues long after they have finished their studies, in the form of reunions. It’s not just about happy memories, but also about entrepreneurship and actively



“The UT wants to strengthen the bond with its 32,000 alumni”

keeping those contacts alive. All the wonderful things that you organized together, from study trips to parties in student houses. This combination of student life and team spirit is such a powerful element of Twente’s DNA profile.”

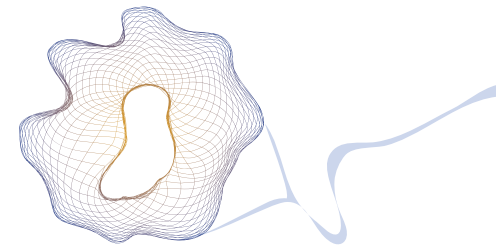
Joe continues, “The UT is keen to strengthen the bond with its 32,000 alumni. They are 32,000 ambassadors for the University of Twente. With their knowledge and

resources (time and money), they can make a valuable contribution to the academic community. Of course, this also applies in reverse; the UT - by passing on knowledge - wants to continue to play a meaningful part in their lives too. It’s our task to make sure this happens. We are always on the lookout for new initiatives so that our alumni can make a difference.”



Want to find out where our alumni have set up their businesses and what the network looks like? Have a look at [utwente.nl/touch/magazine](http://utwente.nl/touch/magazine)

# IN SHORT



## PULSES TO COMBAT PAIN

Spinal cord stimulation is a promising method for treating diabetic patients who suffer from pain. This has emerged from doctoral research carried out by Cecile de Vos. The new treatment method involves using a subdermally implanted 'pulse generator' to stimulate nerve fibres in the spinal cord. The system

resembles a pacemaker, but stimulates the spinal cord instead of the heart. There are one million diabetes patients in the Netherlands, 15% of whom suffer from pain. The intensity of the pain felt by the patients who participated in the research dropped from 8 to 2 (on a scale of 1-10, where 10 stands for the worst imaginable pain).



## MORE DURABLE CAR TYRES

Every year eight hundred million car tyres are discarded, enough to encircle the earth five times. This is not only bad for the environment but accelerates the depletion of raw materials that are becoming increasingly scarce. UT PhD candidate Sitisaiyidah Saiwari has developed a recycling process that can partially solve these problems. Currently, recycled rubber can be used for no more than 5% of some parts of new tyres. The UT research team hope that their recycling process will increase this percentage to forty: a massive step forward. The process is based on the Cradle to Cradle principle, where waste products form the raw materials for new products.



## BEST BUSINESS PARK

Kennispark Twente has been crowned the best business park in the Netherlands. At the national business park conference (Nationale Bedrijventerreinencongres), a jury of fifteen and the assembled delegates ranked Kennispark Twente highest in categories that included economic value, clarity of profile, structural organization, quality of facilities and user satisfaction. Kennispark Twente is an initiative of the University of Twente, the Municipality of Enschede, the Twente region, the Province of Overijssel and Saxion. The Kennispark's mission is to generate 10,000 new, high-quality jobs for the region and to contribute to regional development.

**The Kennispark's mission is to realize 10.000 new, high-quality jobs for the region.**



Total number of UT alumni and students on LinkedIn: **32.226**

### MOLECULAR THREADS

Researchers at the University of Twente have had their work published in the authoritative scientific journal Science. They have succeeded in creating perfect one-dimensional molecular threads, the electrical conductivity of which can be almost entirely suppressed at room temperature using a very weak magnetic field. The underlying mechanism is thought to be closely related to the biological compass used by some migratory birds for orientation in the geomagnetic field. This discovery could lead to radical new magnetic field sensors, e.g. for use in smartphones.



### ANTI-NOISE PANEL

UT researchers have developed a lightweight panel that will make it possible to reduce the noise inside an aeroplane by means of anti-noise. The panel measures incoming noise and responds by using active noise control to cancel it out. As it will soon be possible to use these panels to replace heavy insulation materials in aircraft fuselages, less fuel will be needed to cover the same distance. This will make air travel not only cheaper, but also more environmentally friendly. The researchers expect that the panels can actually be incorporated into aeroplanes within five years.



### 200 BEST UNIVERSITIES

This year the University of Twente climbed seventeen places – from 187 to 170 – in the Times Higher Education ranking, which lists the best two hundred universities in the world. This achievement builds on the momentum of the UT’s thirteen-place rise in 2012. It’s been another

good year for the Netherlands in the THE ranking: with twelve universities in the top two hundred, the Netherlands is the most strongly represented country on the list after the United States of America and the United Kingdom.

This year the University of Twente climbs **17** places in the ranking of the best **200** universities in the world.

A man with light brown, wavy hair and glasses, wearing a blue pinstriped suit, white shirt, and dark tie, stands in a high-rise building. He is looking out a window at a modern building with a distinctive green, geometric roof structure. The background shows a cityscape with a grid of windows on the left and a clear sky on the right. The text "EXCELLENCE HAS BEEN" is overlaid in large white letters across the middle of the image.

EXCELLENCE HAS BEEN

#### **HANS SCHUTTE**

Hans Schutte (1966) studied public administration at the UT (and business economics in Tilburg), having already completed a programme in accountancy. He worked as an independent consultant for a number of educational institutions on a project basis, until he was recruited by the Noordelijke Hogeschool University of Applied Sciences in Leeuwarden. In the period 1996-2012 he worked for four Regional Training Centres (Oost-Nederland, Amsterdam, Nijmegen and Twente) as Director of Finance, member of the Board of Governors and as Chairman of the Board of Governors. Last year he was appointed Director-General of Higher Education, Vocational Education, Science and Emancipation at the Ministry of Education, Culture and Science.

## HANS SCHUTTE, DIRECTOR-GENERAL AT THE MINISTRY OF EDUCATION, CULTURE AND SCIENCE:

For a year Hans Schutte, Director-General of Higher Education, Vocational Education, Science and Emancipation with the Ministry of Education, Culture and Science (OCW) has been working on sustainable and consistent educational policy. He gained his inspiration partly in Twente, as a student and as governor of a Regional Training Centre (ROC). "I had a wonderful time there. It's a place that is characterized by efficient collaboration between education and the business community." BY Hans van Eerden PHOTOGRAPHY Kees Bennema



# PUT ON THE MAP IN TWENTE"

Hans Schutte chose civic commitment at an early age: when he started studying at the UT, he was torn between public administration and business administration. In the end, public administration won out. He got into education through his own consultancy company and became governor of a number of Regional Training Centres, ending up at the ROC in Twente. This meant he had come full circle. "Twente is a fantastic region. The education sector and the business community work well together and you see real connections between intermediate vocational education, higher vocational education and university. It's a really enjoyable environment in which to work."

### Making things

As a former governor, Hans emphatically refers to 'his' intermediate vocational training centre. "There was a time when it was all about knowledge, but professional skills are also extremely important: being able to make what someone has invented. It's that connection between knowledge and manufacture that makes for a powerful economy; look at Germany for example. For the Netherlands, it will be a challenge to make this connection, first within education and then with the business community; Twente has already started down that path."

### Achievement agreements

The newly appointed Director-General sometimes feels a tingle of excitement when he goes on visits to educational institutions. "When I worked there, I was interacting with students and lecturers on a daily basis and I was able to help to shape new initiatives in practice. These days I am more removed from the action, in a totally different environment. I am pleased to be making a contribution to the Dutch education

system from my current position, helping institutions to position themselves so that they can excel. People sometimes grumble about The Hague and incident-driven policy-making. I have a feeling, however, that we now have a sustainable and consistent policy for higher education, thanks to the performance targets set in the Veerman Committee report (ed.: 'A System of Higher Education that is Future-proof', 2010)."

### Spared

Higher education and science are doing well, as can be seen from the Dutch performance on a range of international rankings. Of course, there are still areas of concern, Hans admits, such as the cutbacks which mean that knowledge and innovation no longer benefit from funds channelled from the Netherlands' natural gas revenues. "However, considering the drastic measures taken in other sectors, we should be grateful that – taking everything into account – education and science are being spared quite considerably." Hans regards the consensus on further professionalization and improving quality as a positive sign. "Next year will be marked by interdepartmental research into science, in order to examine how we can do things even better."

### Modernization

Hans Schutte is keeping a close eye on developments in Twente. "Excellence has been put on the map there (ed.: with ATLAS, Twente's own interdisciplinary University College for top students); the Ministry encourages such excellence-oriented programmes. It's a marvellous new education model, which is geared more closely towards the working world, offering students a broader education and more active involvement. It's great to see modernization taking place within the educational institutions themselves."

Sharing your dream in front of an audience of one hundred people, no written notes and a time limit of just over 15 minutes. It's the TED Talks formula that's sweeping the world. The UT had the chance to experience this phenomenon at first hand in October, thanks to the student organizers, including Chairman Frank Brinkkemper and Public Relations assistant Dora Timmer.

BY **Berend Meijering** PHOTOGRAPHY **Rikkert Harink**

# IT'S MAGIC! TED TALKS IN TWENTE

It's the day of the TEDxTwenteU conference. Although not a single speaker has taken the stand yet, Frank Brinkkemper has already made his decision. A student in Business and Information Technology, he is backing Sandjai Bhulai, a mathematician at VU University Amsterdam. "The technology he has developed makes it possible to predict news before the media even know about it." In response to Bhulai's request, the visitors all start twittering using the same hashtag. And Brinkkemper sees it happening before his very eyes: Bhulai's real-time dashboard – showing the fastest breaking news in the making – actually works!

## Clock of death

Dora Timmer, Educational Science student, has chosen a UT celebrity as her favourite: Miko Elwenspoek. He is a man haunted by the clock of death but then his chosen topic just happens to be 'the transitoriness of matter'. In a million years, our planet will be dead and forgotten. So it would be wise to provide other inhabitants of the universe with timely information about who we were and the aspirations of our species. But what code should we use to communicate this? What sturdy material should it be written on? And, to carry on in TED terms, which 'ideas worth spreading' should be allowed to survive humankind? Physicist Elwenspoek has no doubts on that score: "The Feynman lectures!"

## Immersive experience

"Everyone who registers is screened to check their motivation," Timmer explains. And the production process is in the capable hands of Diederik Jekel, UT alumnus and science journalist for the fast-paced TV talk show *De Wereld Draait Door*. It's no mean feat, keeping an auditorium full of students keen-witted and quiet for hours on end. Fortunately, there's always lunch with Oculus Rift to look forward to, a 3D game that involves gliding over mountains and through valleys. ("Mind you don't fall off your chair though! You need a strong stomach to cope with this immersive experience!")

## Street musician

All well and good. But what's up next? With the nightmare of the treacherous afternoon dip looming, the team's biggest asset takes to the stage: street musician Daniel Waples and his percussion instrument the 'Hang'. What better way to liven everyone up again and leave them refreshed and focused? Everyone except Brinkkemper that is. Lost in thought, he harks back to midwinter: there he was at his desk, hunting down a TED licence. An entire UT collective hadn't been able to get hold of one and there he was, a nineteen-year-old student who made it happen all on his own. He leans back and as the final notes of the magical mystical Hang music fade away, a broad grin appears on his face.



"The team's biggest asset takes to the stage"



Curious about the Twentse TED Talks? Check out: [www.tedxtwenteu.nl](http://www.tedxtwenteu.nl)

**Arie Boer works as a Risk and Compliance Manager for electricity producer EPZ (Elektriciteits-Produktie­maatschappij Zuid-Nederland). When he started out in this position, he was well enough equipped to get certain projects up and running. A few years on, however, he felt the need for more comprehensive and in-depth expertise. That is why at the end of 2011, he took up the part-time Master's programme in Risk Management.**

BY Lidewey van Noord PHOTOGRAPHY Kees Bennema

## **"EVERYONE BRINGS A WEALTH OF EXPERIENCE WITH THEM"**

In 1980, after completing his Analytical Chemistry studies in Breda, Arie spent years working in a variety of jobs at a chemical company. During this time, he attended several courses, including a two-year course in Quality Management. Since 2007 he has worked for EPZ, the company responsible not only for the nuclear power plant in Borssele, but also its neighbouring coal-fired power plant.

Arie's job centres on developing and supervising risk management for EPZ. "Safety, availability of production installations, finance, security... in fact, it covers just about every policy field at EPZ. I am involved in strategic risks, process risks, but also project risks. There are many different aspects to my job. At the moment, for example, I

am in charge of a project aimed at increasing the maturity of the nuclear power plant's integral management system."

Arie believes that the Master's programme in Risk Management is a perfect match for his job. "The theory you just need to learn. The biggest challenge is applying theoretical concepts in practice. How do you develop ideas in such a way that they can be implemented and function properly? I often work with colleagues from entirely different disciplines. You get such satisfaction from seeing the results that can be achieved as a result of shared knowledge, patience and perseverance."

The Master's programme at the UT has provided Arie with specific

tools for putting theory into practice. "But it's up to you to actually make it happen." This isn't something that Arie finds surprising or problematic: "My fellow students all come from entirely different backgrounds, such as the construction industry, the police, the tax department and banking. This means that 'putting it into practice' is different for everyone."

The Master's in Risk Management has given Arie a context, and a strong foundation. He sees this as the most valuable aspect of the course, though he also very much appreciates and enjoys the interaction with his fellow students: "Everyone brings a wealth of experience with them. This really livens up the lectures and the rest of the time we spend together."



**"It's up to you to actually make it happen."**



The first ever LEGO Solar Race was a resounding success. The seven hundred primary school children and thirty teams packed into the venue in the Waaier building on the UT campus had the time of their lives. BY Jochem Vreeman PHOTOGRAPHY Eric Brinkhorst

# LEGO SOLAR

During the LEGO Solar Race, the children battled against one another with the LEGO Solar cars that they had designed and built themselves. Straight after the summer holidays, the thirty teams set to work with the world-famous building bricks. The LEGO Solar Race was organized within the framework of the UT's Open House. The event took place one day before Solar

Team Twente started on the World Solar Challenge in Australia with their solar-powered car The RED Engine. Thanks to a Skype connection, the 'RED Engineers' in-the-making were able to contact their counterparts Down Under. The Light-Rider team from Dalton Hengelo Zuid primary school took first place, completing the course faster than all the other participants.



# RACE

The teams were assessed on the speed of their solar car, the best technical idea and the promotion of their design. It was a special event that introduced the young talents from Twente to technology and sustainability, under the supervision of UT students.



Missed the Open House or want to re-experience this inspiring day? Watch the video compilation at [utwente.nl/touch/magazine](http://utwente.nl/touch/magazine)

## RETIRING DEAN RIKUS EISING

Professor Rikus Eising spent more than seven years as Dean of the Faculty of Engineering Technology. "I am proud to have succeeded in giving people a greater feeling for commerce."

BY Wiebe van der Veen PHOTOGRAPHY Gijs van Ouwkerk

# I AM NOT ONE

"If something is good or beautiful, then it is also of value. It could be of significance to society and earn money. The Faculty is much more aware of this than it used to be. The professors are now bringing in funding independently, with only the occasional nudge from me at most." One of the results is that more money for research is now flowing into the Faculty 'from outside sources' than from the government. The ratio between direct government funding and indirect government funding plus commercial funding exceeds 100 per cent.

are looking for a Dean, will you come and discuss it with us?" After 22 years at Thales, the prospect of another seven years doing something entirely different appealed to him, and so it was that he joined the UT as a Dean in May 2006.

"I was immediately struck by the excellence of the education provided in the Mechanical Engineering, Industrial Design Engineering and Civil Engineering programmes. All I need to do is cite Elsevier magazine's most recent survey: all three programmes came top in their category! It's a wonderful feeling to walk around one of these buildings full of young people shaping their future, and to be in a position to help them."

### Pride

"In my opinion, we didn't take enough pride in our research back then. That's something we've succeeded in turning around. When I arrived, the Faculty already had


strong ties with industry, including regional industry. We need to maintain and strengthen those ties, but we also need to let the world know about them: spread the good news! Our scientific output in peer-reviewed journals has increased threefold during the past seven years, reaching 544 last year. We have also grown considerably as far as PhD candidate places are concerned."

One of Professor Eising's favourite examples is the acoustic research by Ysbrand Wijnant, who has developed a compact method of reducing road-traffic noise pollution. Not by constructing enormous sound barriers along motorways, but using special paving stones that divert sound. These are already being tested alongside roads in the region. "Nowadays Ysbrand works part-time at the Faculty in addition to running his own company. I'm delighted to see that people are

"The UT could do with an extra helping of commerce"

More than seven years ago, while still a Special Projects Director with Thales, Professor Eising was talking to colleagues about whether or not to take early retirement, when suddenly the telephone rang: "We





“Let the world know: spread the good news!”

# TO FIND FAULT

also finding their way in the outside world.”

## Bio shift

Professor Eising sees a clear shift towards ‘bio’ in ‘traditional’ Mechanical Engineering, a shift that goes beyond the rehabilitation technology in which the Faculty has always excelled. “We have a tradition of tribology here, which is the science of friction and lubrication. This usually involves metal. Recently, the entirely new branch of ‘skin tribology’ has emerged. Similarly, fluid mechanics can also be of significance in research into lung disorders. Thanks to developments like these, about 20 per cent of our professors now work in the field of biology.”

Another gap in the market has been filled in the field of maintenance engineering, under the leadership of Professor Leo van Dongen, who divides his time between his part-time professorship at Twente and

his position as Director of NedTrain, responsible for maintaining the rolling stock of the Dutch rail operator NS. “In this area, we have recruited a few more people from outside, from the Netherlands Defence Academy and from SKF. Our courses in this field are always fully booked up in advance.”

## Spirit of enterprise

The professor’s seven years at the UT were clearly full of the spirit of enterprise. “As a university, we are doing a good job in this regard but we could do with an extra helping of commerce. The first step is awareness.” The retiring Dean is therefore pleased that the words “most entrepreneurial university” recently adorned the University’s façade, at a time when the old slogan “the entrepreneurial university” had faded into the background.

“What was different from my previous position? In a university everyone believes that the

discussions on all fronts can be reopened again and again. Nothing ever becomes truly fixed. That’s not a good thing. As an administrator, in my dealings with the Faculty, but also with the Executive Board, I have never been one to find fault. You don’t have to pin everything down with lots of little rules and regulate all possible exceptions. If something doesn’t quite work out, we’ll find a solution anyway.”

Although he has now been given emeritus status, Professor Eising is still active in a number of fields, including the Thermoplastic Composite Research Center (which the UT set up together with textile technology concern TenCate, Fokker Technologies and Boeing), the Polymer Science Park in Zwolle and the Cradle-to-Cradle ExpoLab in Venlo. He is also commissioner at the waste processing and energy company Twence. “A couple more jobs, let’s say for one or two days a month, that would be nice.”



## THE 2013 DIES NATALIS LECTURE BY CHIP ARCHITECT BRAM NAUTA



# THE INVISIBLE CIRCUIT

It all seems so matter-of-course these days: yet another new tablet or smartphone is launched, offering even greater capabilities. Our car can call up the garage all by itself in the event of a defect. Yet, according to Professor Bram Nauta, in his lecture to mark the University of Twente's 52nd Dies Natalis, the world would look very different without the designers of chips.

BY **Wiebe van der Veen** PHOTOGRAPHY **Gijs van Ouwkerk**

Quickly checking a fact or two on Google, 'liking' something on Facebook or sending a Tweet out into the world. Try to imagine these activities without the existence of integrated connections, or chips as we like to call them. "Believe me, you'd be right back to the 1950s," Professor Nauta insists. "Just picture it. Back then, Facebook would be a large notice board on which people would pin up photos and where other people would hang little notes under them saying 'I like this'. But you would have to actually go to that notice board and how would you even know where to find it? Would someone send you a letter by post, containing the relevant information?" Technology has made things possible that we could never even have imagined only a short while ago, the Professor in Integrated Circuit Design observes. "We even have the impression that all this is happening automatically. But that is absolutely not the case. Your iPhone contains dozens of billions of components on chips. Not one of them is faulty. Just think about that for a moment."

**'Technology is always a  
few steps ahead'**

### Twenty years

Professor Nauta heads one of the world's leading research groups in the field of chip design. "In plain English, we make sure that a smartphone's reception is optimal and that the battery lasts as long as possible. It's really something of an art form, negotiating all the wireless standards and requirements. It could well be that the next smartphone will soon be much smaller, and may not even look like a phone. Twenty years ago we couldn't imagine everything that's possible now, and today we are equally incapable of looking twenty years into the future. One thing is clear, however: technology is always a few steps ahead."

By taking his audience on a virtual 3D journey through a chip, Professor Nauta showed the enormous complexity that is not even visible to the naked eye: a city on micro and nanoscale. Moore's law, which has dictated the speed of miniaturization for decades, has made it possible to store an increasing amount of data in a single square millimetre. But that same law has also rendered these magnificent specimens of design technology more or less invisible. In his lecture, Professor Nauta succeeded in bringing these wonders back into the visible realm, along with the inspiration of the designer.

## ORGANIZATION

The University of Twente is where talent can best realize its full potential. Students and staff are the key. Together, 3,300 scientists and professionals carry out groundbreaking research, bring about socially relevant innovation, and provide inspiring teaching for more than 9,000 students. To us, entrepreneurship comes as second nature. The campus is home to around 100 businesses, including student-run businesses. The University of Twente has also generated more than 700 successful spin-off companies. The university's business park, Kennispark Twente, encourages and assists entrepreneurs to start new companies. But there's so much more than that happening on our wonderful, green campus. Our sports and cultural facilities are unique and we host events such as the world's largest student think tank, Create Tomorrow. Another legend of the Twente campus is the Netherlands' largest student sports event, the Batavieren Race. The campus is a hive of activity - a truly inspirational place to be! - University of Twente, the entrepreneurial university.

## Colophon

E-magazine for alumni and relations of the University of Twente.

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## KEEPING HEALTHCARE COSTS IN CHECK

The cost of healthcare is ever increasing. Politicians are already drafting a number of scenarios. These seem to mainly focus on the fact that the population is ageing. The elderly are to increasingly rely on their direct environment and to remain independent longer. Of course, technical solutions may provide some relief, but we always need to take stock whether they actually are the cheaper option 'below the line'.

The University of Twente is investigating healthcare cost control solutions from a number of different angles. The Centre for Health Operations Improvement Research (CHOIR), for instance, cooperates with a number of hospitals to improve hospital 'logistics'.

What is the optimum way of scheduling the use of an MRI scanner, and ICU or OR, all the while keeping account of a large variety of factors, like personnel availability? Often, investigation shows that it's not only possible to reduce costs, but also to reduce work pressure while improving the quality of the care. At the same time, on the prevention side of healthcare, new tools like e-health are able to help improve our lifestyle, significantly reducing the need to require healthcare in the first place.



**TATIANA FILATOVA WINS PROFESSOR DE WINTERPRIJS.**



**MENNO VELDHORST WINS OVERIJSSSEL PHD-AWARD.**

SPIN-OFF

# DISPOSABLE LABORATORY

BY: Joost Bruysters PHOTOGRAPHY Kees Bennema

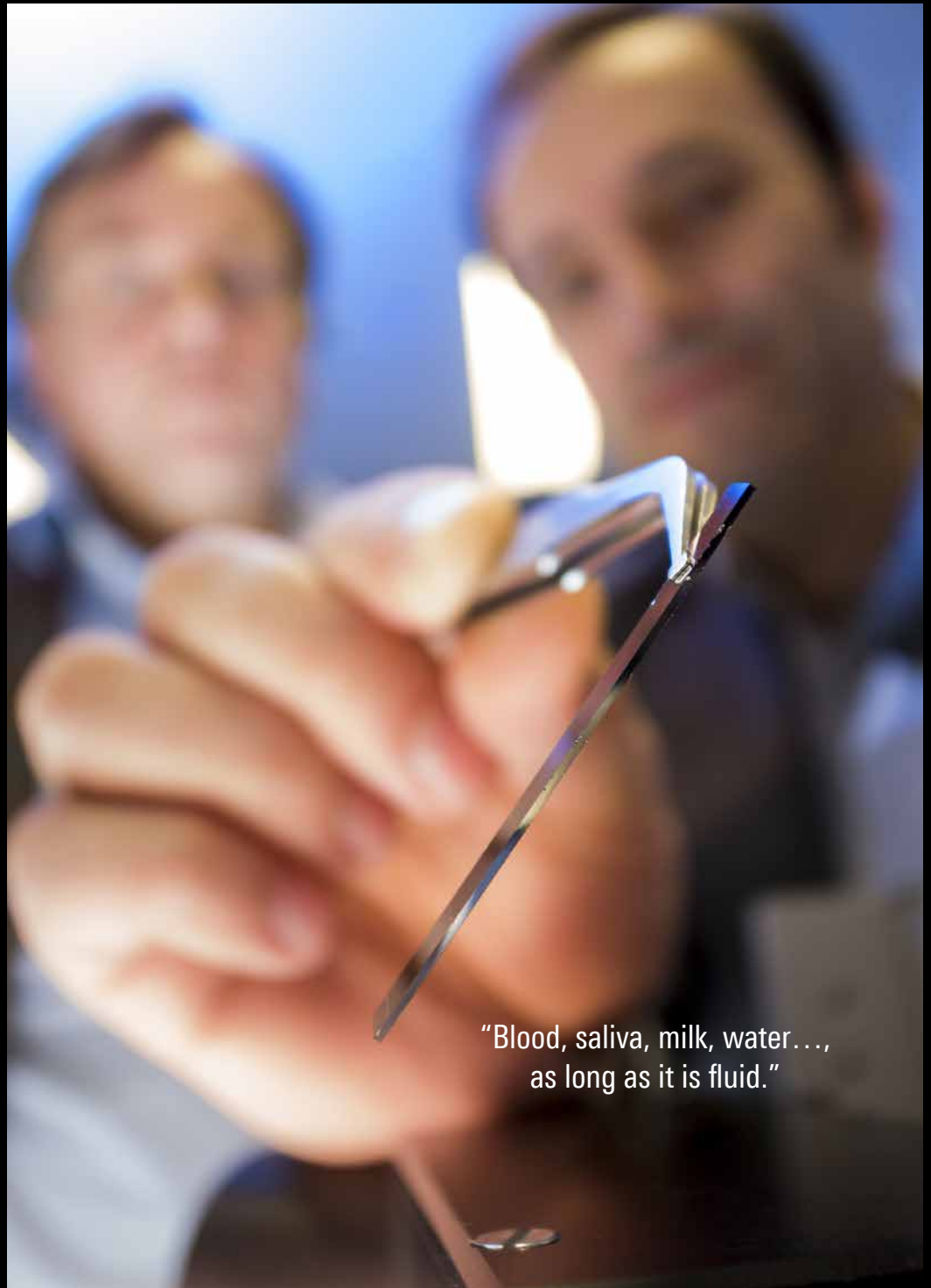
Analysing a blood sample usually takes a few hours and requires a complete hospital laboratory. If Paul Nederkoorn and Aurel Ymeti of the UT's Ostendum spin-off company have their way, all this is about to change. They develop portable laboratories that can be used to measure the concentration of viruses, bacteria and specific proteins. Paul Nederkoorn explains, "The ultimate goal is to make a cheap disposable chip for analysing samples immediately and on-the-spot."

There are two parts to Ostendum's system: an optical chip, onto which fluid is applied, and a detector for reading the chip. "The fluid could be just about anything," says Nederkoorn. "Blood, saliva, milk, water..., as long as it is fluid." The company has even ground liver sausage and dissolved it in order to find out whether certain bacteria grew on it.

The technology emerged from Ymeti's doctoral research. For the moment, Ostendum is focusing on health care and food safety. It is difficult to say how long it will take before the system can be put to use on a large scale. "Innovations in health care take a long time and you need a lot of capital. It will be a lengthy process." Nevertheless, all of the signs are looking positive. The business world is interested and health insurers Achmea and DFZ recently invested substantially in Ostendum. What's more, the company recently won a highly prestigious European innovation prize from Frost & Sullivan.

[www.ostendum.com](http://www.ostendum.com)

UNIVERSITY OF TWENTE.



"Blood, saliva, milk, water...,  
as long as it is fluid."