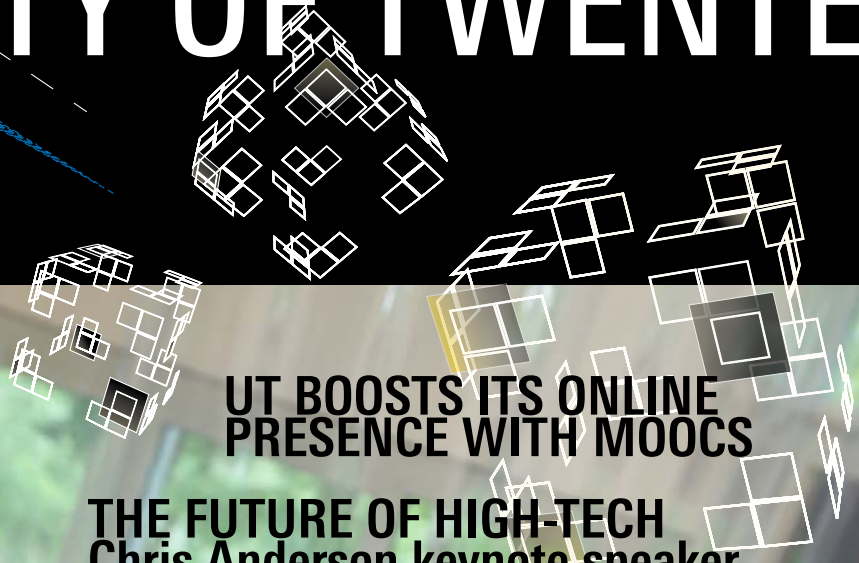
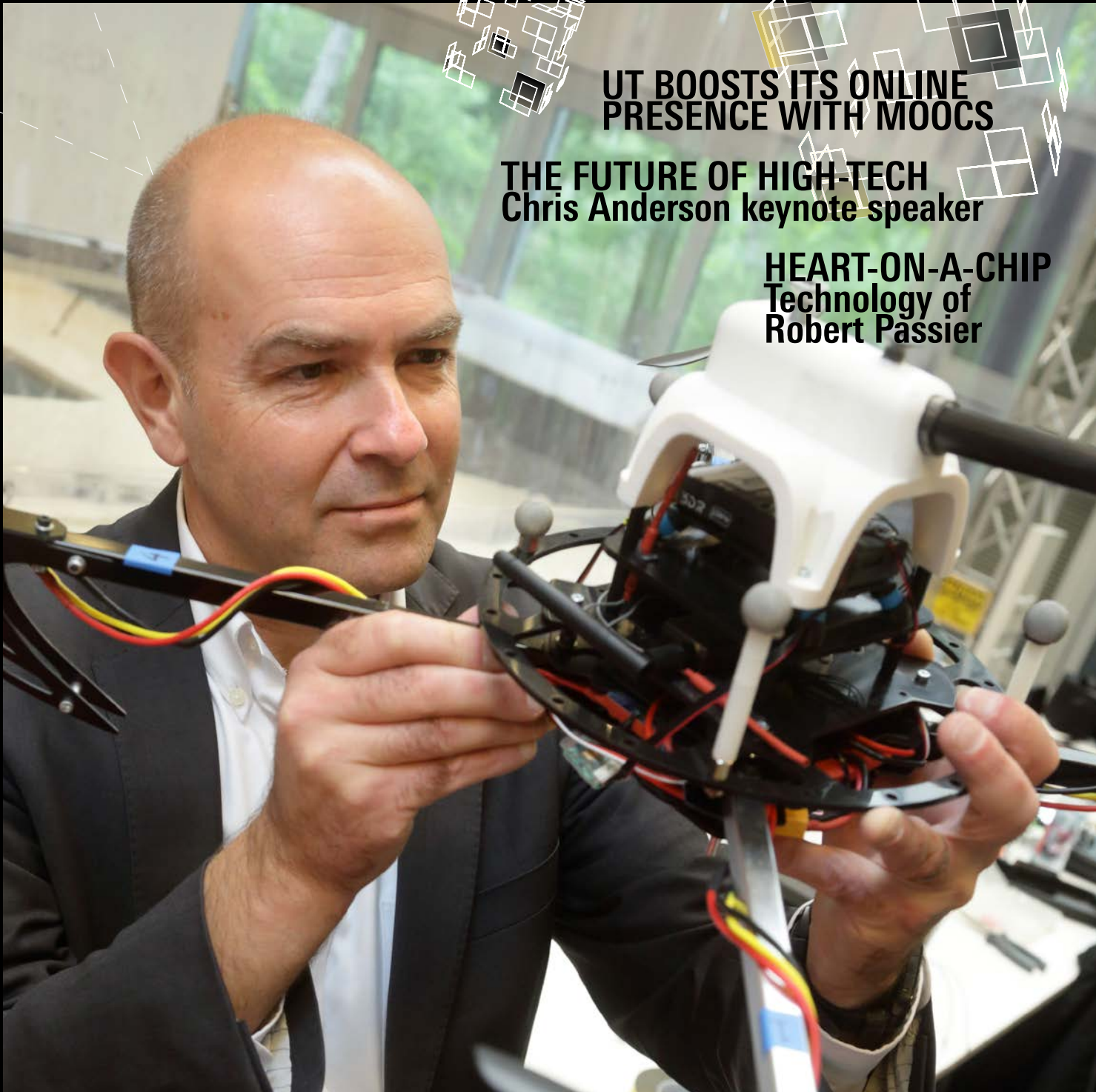


UNIVERSITY OF TWENTE.



UT BOOSTS ITS ONLINE PRESENCE WITH MOOCS

**THE FUTURE OF HIGH-TECH
Chris Anderson keynote speaker**

**HEART-ON-A-CHIP
Technology of
Robert Passier**

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Cover image: Chris Anderson



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VITALITY

For years, Silicon Valley has been the destination for many delegations of municipal civil servants who want to see with their own eyes how things work there. All these municipalities and regions want to have an innovation hotspot of their own within the city limits, to act as magnet for real jobs. Valleys, hubs, science parks can be seen up and down the country nowadays. The question is whether they will produce the same 'buzz' in the Netherlands as they do in Silicon Valley.

Peter Ester and Arne Maas drew up a list of success factors in a recent analysis. A history of decades of break-through discoveries coupled to a huge drive to bring them to the market. A culture in which failing is not a disgrace. And while the impression we get is that Silicon Valley is a kind of free state mainly backed by private investors and where the authorities are kept at bay, the government actually targets very heavy investments here. The notion that this could be copied into a Dutch context, in its entirety, is – according to the researchers – an illusion. They also point out that there is a downside, namely the enormous social inequality in the US. On the other

hand, the very cultural differences that exist between the two countries will actually help to facilitate the establishment of a robust Dutch variant.

As the most enterprising university with a strong Knowledge Park, we have the right qualifications to achieve this. Nevertheless, we can also learn from the eagerness in Silicon Valley, perhaps we should stop perfecting ideas until they are ready for the market. We could spend more time keeping each other astute, in the same way our student entrepreneurs do in their 'Hardstart' community. In order to keep ahead of the law of the 'handicap of the head start', we really have to do more than all the other start-up hotspots. Because after all, Silicon Valley is also subject to this law. Right now some online companies are falling by the wayside as others thrive, just like they did in the large internet bubble years ago.

This is precisely the time when you want to go flat out and invest, that's what it means to show vitality and courage. If that is the message all those delegations take home to their own region, then visits like these will have been meaningful. ●



"THE TIME TO GO FLAT OUT AND INVEST, TO SHOW VITALITY AND COURAGE"



VICTOR VAN DER CHIJS, LL.M.,
(1960) CHAIRMAN OF THE UNIVERSITY OF TWENTE EXECUTIVE BOARD SINCE OCTOBER 2013.

MANAGEMENT IS THE BIGGEST CHALLENGE FOR START-UPS

The opportunities for financing start-ups are increasing rapidly, in particular because large companies are opening up more and more to ideas from outside. In turn, young companies should also open up more to management experience and market expertise from outside to become successful. That was the tone of the 'The future of high tech' event, which was held on the campus at the end of May as part of the national StartupFest, with Prince Constantijn van Oranje as the main driving force behind it. BY Christian Jongeneel PHOTOGRAPHY Rikkert Harink & Gijs van Ouwkerk

THE FUTURE



Chris Anderson



Prins Constantijn

Meetings about start-ups sometimes have the tendency to radiate so much American optimism that reality fades into the background. That is why it was a good idea for the organization in Twente to invite Detlef Pohl, managing partner at Siemens Venture Capital, a branch of this multinational with control over 1.6 billion euros of investment capital. Mr Pohl painted a sober portrait of the investment process. Siemens approaches start-ups on three levels. Firstly, there are the raw ideas, which need a sparring partner and probably some facilities. Secondly, there are the smaller start-ups in an advanced stage of development, which Siemens supports with one or two million euros for a number of years. Thirdly, there are the large projects. Mr Pohl focussed mainly on the first two groups.

"Even for me, it is difficult to find relevant partners for specific technology within Siemens— and that is just one company. Finding your way is not easy. There is lots of money available from big companies, but you have to be prepared to tell your story twenty times. You also have to be patient. It can take anything up to a year between an informal agreement and signing the definitive contract. A company like Siemens manufactures products which last twenty to thirty years. We guard our image, so we take the time to make sure we are confident about the quality of our partners."

"Usually start-ups have two contracts with us. The main points are described in an agreement with the technical department to which they are linked. The financial agreement

is more detailed. This mainly states what you are not allowed to do. That is just the way it is. There also has to be an international business perspective. This is where our network can help. We know how you should go about approaching people. In America, it quickly gets down to how much money could be made. Germans want to know how the technology works."

Flow of expertise

The arrival of 'corporate capital' on the start-up market is the trend right now. The more traditional start capital is still around of course, however, big companies with lots of money on the shelf are very much coming forward. This appears to be the logical next step after intense cooperation with universities in recent decades. ▼



OF HIGHTECH



Jaap Beernink



Nico Nijenhuis

JAAP BEERNINK: "LINK START-UPS AND ALUMNI"

"Of course, the University of Twente plays a central role in the regional start-up network. It provides the basis in the form of technology and talent, but it also invests to give start-ups a flying start and provides access to facilities. The role of the university is particularly important to the image the outside world has as it positions Twente as a knowledge region."

Jaap Beernink is convinced. The University of Twente alumnus and president of the Technologie Kring Twente (TKT – Technology Circle Twente) has no doubt that it is education – from The University of Twente, as well as Saxion University of Applied Sciences and Regional Community College of Twente (ROC) – that forms the basis for the region's success. TKT was founded by the university's first start-ups, as although they used different technologies, they quickly

realized they could learn from one another when it comes to entrepreneurship. Mr Beernink himself heads Golden Egg Check, a start-up which informs other start-ups about the needs of investors. These differ depending on the type of investor and the country. It's important to know the latter because many start-ups embark on niche markets in the international arena and therefore are of interest to international investors. Golden Egg Check accelerates that match.

In order to further stimulate matches, the university could probably appeal to its alumni network more often, thinks Mr Beernink, "There are three things that are essential to start-ups: talent, capital and access to the market. The last of these three is the most difficult. And alumni have the networks which could help."



Green Team Twente



Dennis Schipper



Chris Anderson



Ray Quintana

DENNIS SCHIPPER: "SCALE-UPS REQUIRE A DIFFERENT APPROACH"

Founded in 1994, Demcon is one of the first start-ups produced by graduates from the University of Twente. Back then, entrepreneurship was still in its infancy and founder Dennis Schipper was forced to invent many wheels. At the same time, he could have avoided many mistakes if his young company had received more supervision. "That is not something which the university can provide. You learn the most from being in a commercial environment."

In 22 years, Mr Schipper, who was even taught by Harry van den Kroonenberg himself, has seen technologies come and go. However, there are also constant factors. "The entrepreneurial spirit is still the same. The enormous willingness of the university to make knowledge accessible and the seek funds is an important success factor in the ecosystem. Start-ups also have the tendency to keep on making the same mistakes, for example by thinking that the market will simply come to them as long as they have a technically interesting product. However, selling a discovery takes more effort than making the discovery itself."

Partly for this reason, Mr Schipper thinks more attention should be paid to scale-ups – young companies which have grown out of the start-up stage, but which are hesitant to take the next step. "At that stage, money is no longer a problem," he explains. "You need assistance, maybe even a new managing director, someone who brings management experience into the company. Young entrepreneurs also have to get used to having shareholders, and the idea that they are no longer the owners. This phase requires a different approach."

"Selling a discovery takes more effort than making the discovery itself"

So, now Mr Schipper helps other start-ups. We can guide them, but Demcon sometimes also provides an injection of capital by taking a share in a new company. One of 'his' companies, Focal, has received the Van den Kroonenberg Award for young entrepreneurship. Focal develops precision optical systems for medical and other purposes. Demcon itself won the award in 2001.

THE KEY LIES IN THE QUALITY OF THE ENVIRONMENT

“There is not a single company which can beat a well-functioning start-up ecosystem.” In his keynote speech at The Future of High tech, Chris Anderson, top entrepreneur at 3D Robotics and author of *The Long Tail* gave a good insight into the world of successful start-ups. “The key does not lie in the best technology, but in the quality of the environment and that of the cooperation.”

Entrepreneurism is required to take technological innovations further. Mr Anderson gave a string of examples showing how the start-ups of today can be the global game changers of tomorrow. “It is better to ask for forgiveness rather than permission,” says Mr Anderson, “What if AirBnB had asked whether it was allowed to set up a hotel business first? Then it would have been told ‘no’ and it would never have been what it is today.”

Mr Anderson was at the birth of a big drone builder. “The air travel authorities expected around 25,000 drones to be in the air in the US by 2020. However, after a while that was the number we were building per month. Now there are already millions of them,” he laughs.



Chris Anderson

This has led to bigger exchanges of information between companies and universities. Now more and more graduates are starting up for themselves, multinationals are clearly looking around to see where the flow of expertise is going.

This has also come about because established venture capitalists are shifting their attention to software and services, analysed Dave Blivin, managing partner of Cottonwood Technology Fund, which focuses on start-ups with tangible products. “Large companies can see there is a gap and they are filling it. This is also because investment in hardware is relatively expensive.”

Mr Blivin also stresses that it’s not the technology which is a problem. “I don’t want to put anyone off, but there is no lack of ideas. An invest-

ment of a few hundred thousand euros usually gets the technology on track. We prefer to invest one or two million euros, because we believe this is what you need for the marketing and management. That has to be done professionally and that costs money.”

Struggle

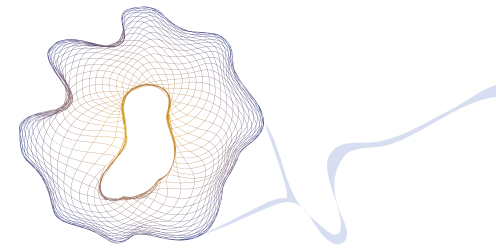
Hans Nijs, former CTO at chipmaker NXP, pointed out that the costs of hardware innovation are increasing so fast that even big companies are struggling to meet them. They even have to focus on mass production to earn their investment back.

“They are increasingly focusing on manufacturing kits rather than end products, which others can use to make end products,” says Mr Nijs. Chris Anderson, who fabricated his

first drone on the kitchen table using existing parts, showed how creative you can be with kits. The company which grew from this, 3D Robotics, still uses cheap standard parts as much as possible. The innovation lies in the applications and the software. “We only have a couple of patents to make sure no one else applies for them,” said Mr Anderson proudly. “Furthermore our platform is open. We give away knowledge, because we are convinced that we get more back in return.”

One of the recipients of this knowledge is Clear Flight Solutions of UT alumnus Nico Nijenhuis. His first robotic bird was based on Anderson’s technology. Even for start-ups which do not want to take the corporate route, there are enough ways to make headway in innovation.

IN BRIEF



KEYWORDMATE

In total, 97 percent of people who are looking something up on the internet do not look further than the first page of Google. As a result, you cannot easily find small or young webshops in your search results. KeywordMate, a spin-off of the University of Twente, has the solution for these webshops. The company has managed to copy and keep up with the search algorithms of Google. The software predicts which search terms and combinations of search terms will get websites on the first page of Google. The software of KeywordMate is based on a self-learning algorithm which adapts to the changes which Google regularly makes to its own algorithm.



10TH ANNIVERSARY OF ECTM

The Experimental Centre for Technical Medicine (ECTM) on the University of Twente campus is celebrating its tenth anniversary. At the ECTM, one of the world's most innovative medical simulation centres, students and medical professionals train their

surgical skills and emergency medical procedures as well as other skills. In the ten years of the centre's existence, 1,600 students and 950 medical professionals have trained there. As many as 13,600 heart attacks have been simulated.



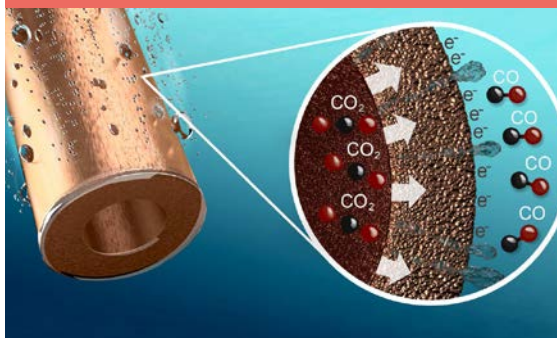
ROBOTIC BIRD

Clear Flight Solutions, a spin-off of the University of Twente, has developed the Robird, a realistic, robotic falcon to chase birds away at landfill sites and airports as well as other locations.

The Robird recently made one of its first flights at the Weeze Airport in Germany. CEO Nico Nijenhuis called it a historic step. "There has been lot of interest from airports for years, including from Amsterdam Airport Schiphol, but Dutch legislation has made it difficult to work there." That is why the company shifted its operations to Germany.

SUSTAINABILITY

Engineers at the University of Twente have developed an electrode, in the form of a hollow, porous copper fibre which very efficiently turns carbon dioxide (CO₂) into carbon monoxide (CO). This discovery makes it possible to make all kinds of industrial processes more sustainable, for example in the steel industry. The conversion rate of this highly efficient electrode is around ten times higher than the most advanced copper electrodes currently available. The engineers have applied for a patent for their discovery.



ROBOTIC GUIDE

After over three years of building and programming, the first tests with robotic guide Spencer have been carried out at Amsterdam Airport Schiphol. This robot, which was partly developed by the University of Twente, accompanies passengers to their gate. The robot, which has a detailed map of the airport and laser eyes to measure distances, is able to recognize groups, to adjust his speed to match the group and to avoid obstacles in its path. One of the things engineers at the University of Twente are also researching with the robot is which behaviour passengers believe is socially acceptable.



AVATAR

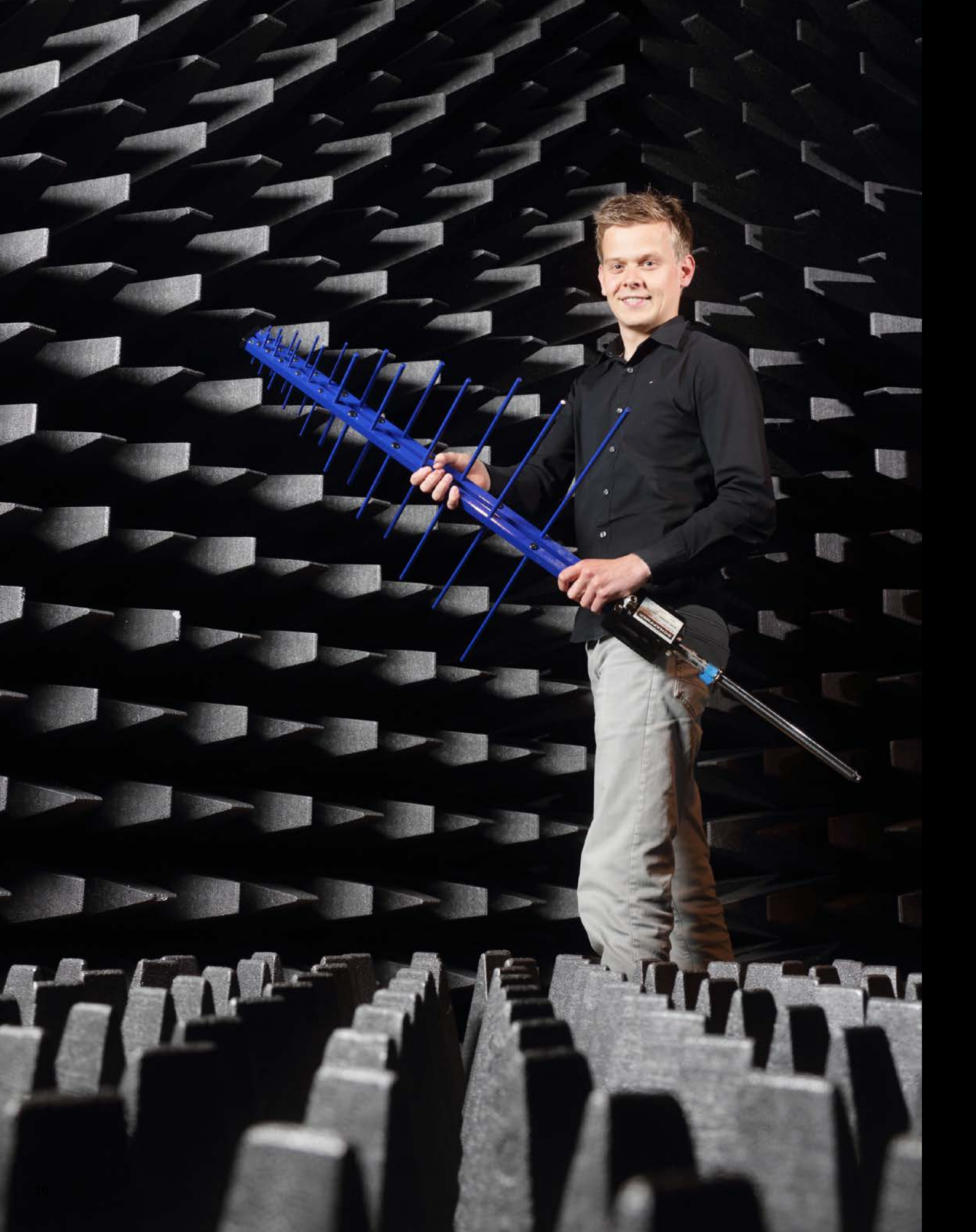
The police, investigators and custom officers increasingly require more effective methods to detect lies during interrogations. Automated lie detectors can be a key weapon in the battle to make interrogations more efficient. Interrogations can take place for instance using an avatar: a graphic representation of a person on a computer screen. Research by the University of Twente shows that the use of avatars only works in interrogations when the person under interrogation believes the avatar is being controlled by a real person and not a computer.

PHD MARRIAGE

Hoon Suk Rho and Yoonsun Yang are not only happily married; they also did the same research at the University of Twente. They recently received their PhD on the same day. The couple worked on lab-on-a-chip applications with which you can separate and analyse organic mixtures. During their PhD research the couple published two scientific articles.



For further information on all these items, see our renewed website www.utwente.nl.



Thieves today have a device in their tool box to disrupt mobile traffic in the direct vicinity, cutting off telephone communication to the police. Life these days is unimaginable without wireless communication, a technology that is growing exponentially. But wireless is not without its vulnerabilities, even in simple devices like the remote control on our car keys. BY Wiebe van der Veen PHOTOGRAPHY Gijs van Ouwkerk

WIRELESS VULNERABILITY

We press the button on our keys to open the car door without a thought. It's handy when you don't have to fiddle around to get the keys in the lock in the dark. And it makes it easier to find the car in the car park. The key and the car have a digitally encrypted code, so things should be secure. At least, that is what you would think. "There is nothing wrong with the security itself, but the makers only looked at the digital encryption. That's quite clever: the car and the key no longer have a set code that can be easily intercepted. The code changes each time you press the button. However, if the radio signal from the key to the car is disrupted, then the smart code will not actually reach the car. My research is about this connection and the vulnerability to electromagnetic attacks," say Stefan van de Beek. He studied Electrical Engineering at the University of Twente and is currently doing research for his PhD in the Telecommunication Engineering group.

Vital channels

Our mobile telephone traffic, WiFi, Bluetooth, wireless house telephones, and GPS satellite navigation are all vulnerable. Van de Beek explains: "There are jammers on the market that can disrupt wireless

traffic in the direct vicinity. Today's burglars use these devices to prevent people ringing the police. They are illegal, but can be ordered on the internet easily." It's even more serious when vital infrastructure is threatened, such as the emergency services, which communicate using the C2000 system. It is difficult for third parties to eavesdrop, but blatantly disrupting the radio signal is possible. That is why Van de Beek has carried out many measurements on the C2000 base stations. His research has not only exposed weaknesses, but has also resulted in strategies which are vital to protecting communication channels. The need for this kind of protection is finally starting to get through to people on all levels. It is not for nothing that Van de Beek's research is part of a large European project called STRUCTURES:

Strategies for the improvement of critical infrastructure resilience to electromagnetic attacks.

Better receivers

The arrival of 5G communication and the Internet of Things, in which more and more devices will 'talk' to each other, is only increasing our dependency on wireless technology. There are more and more self-driving cars on the road, and even

trains can now be driven by remote control. An attack on the radio signals in these systems will directly affect our safety. "Still, you see greater emphasis on cyber security than on protecting radio signals, even though there is tremendous room for improvement in this area. Of course, you can bring down or destroy any system if you have a big enough electromagnetic field. But it really does pay to invest in better receivers."

"It really does pay to invest in better receivers"

The car key is a simple example. All a thief has to do is disrupt the radio signal between key and car. The car will not receive the code, but the thief can store the code and use it to open the car at a later time. "The receiver in the car is usually a simple device that is wide open to various frequencies. Even wireless devices in the vicinity can stop you from opening your own car. That makes it very easy for thieves. Better receivers are more selective, responding only to one particular sender. Car manufacturers really should invest more in this technology."

Companies form the basis of the University of Twente Fund Foundation. Over the years, alumni and current and former staff members have become fund donors. Students and researchers benefit from the support of the University Fund. Herman Hazewinkel, chairman of the fund and Maurice Essers, managing director, together with the advisory board are appealing for new financial support.

BY Esther Windt PHOTOGRAPHY Arjan Reef

“COMPANIES, THIS



CV HERMAN HAZEWINKEL (1949)

2005

Supervisory board member (chairman), TKH Group
Supervisory board member (vice-chairman), Schiphol Group
Non-executive partner, Baese Strategy & Finance
Supervisory board member, Heisterkamp BV

2010

Supervisory board member, Boskalis
Supervisory board member, HET Symfonieorkest
Supervisory board member (chairman), Soweco NV

2015

Member of the Board of Directors Dockwise

2010 - 2014

Supervisory board member (chairman), Soweco

1999 - 2008

Chairman of the Executive Board, VolkerWessels

The University of Twente Fund Foundation existed before the university itself did. In 1948, the fund was established with the intention of bringing technical higher education to Twente. 47 regional firms came together to achieve this goal. Once the Technical College of

shrinking, so we have to find money in other ways. We use these funds to support research, teaching and student activities.”

Mr Hazewinkel explains: “One campaign during our big anniversary year of 2011 doubled the number of alumni who sent us a donation. That

way: he sees the huge benefit the university brings to the region. “In particular, I see the importance of having a lively university community, because it is more than an educational institution. The university has had a big impact on regional life and dynamics,” says the chairman.

IS YOUR FUND TOO”

Twente (the predecessor of the University of Twente) was realised in 1961, the objective of the university fund changed. “However, the cooperation between the university and local businesses has always continued.” says Herman Hazewinkel (on the right of the photo). “The financial support makes it possible to finance dozens of special chairs for innovative research and research programmes.”

In addition to scientific research, the fund focuses on the campus community with its facilities and associations. “Things that make life at university appealing. And we use the fund to encourage a number of academic activities such as scholarships, congresses and research.”

Fund raising

The University Fund also turns to the institution’s alumni, says Maurice Essers, the fund’s managing director and head of the Alumni & Development Office. “The Alumni Office wants to keep alumni involved in the university. To see what we can do for each other. We raise funds through the University of Twente Fund Foundation from alumni and other contacts. Fund raising has become increasingly important in recent years. Our budget has been

was a clear sign for us that there must be more opportunities out there for fund raising. We are now pursuing these opportunities by taking a more professional approach to our campaigns. And it appears to be working. So we’re going to keep it up, for instance with the ‘Make the difference’ campaign. The more money we raise, the better we are able to support the university and the student community.”

But there are other opportunities too, such as named funds. “These are private individuals who donate to a fund bearing their name. They maintain control over how their money is spent,” says Mr Essers. “And whether you donate 50 or 10,000 euros, every little bit helps.” Mr Hazewinkel concludes, “We mainly value their commitment and see our donors as partners rather than sponsors, because we are all in it together.”

Lively university community

Mr Hazewinkel (who earned a degree from UT in economics and whose career has taken him to VolkerWessels and other companies) explains his personal motivation for his work for the University of Twente Fund Foundation since 2010 in this

He finds the work inspiring. “You quickly see the fund’s impact and the connection between the university and the regional community, local businesses and other colleges, like Saxion University.” The knowledge infrastructure is incredibly important for the development of businesses and therefore for the region, according to Mr Essers. He concludes, “We tell businesses: this is your fund too, and you are welcome to get more involved. In fact, we’d love you to.”

Board members of the University of Twente Fund Foundation:

Herman Hazewinkel, chairman

Wilma Toering-Keen, treasurer

Ilonka De Beer, secretary

Gé Klein Wolterink

Victor van der Chijs, chairman of the University of Twente’s Executive Board

Would you like to support the University of Twente?

Go to the website www.utwente.nl/ufonds or get in touch with Maurice Essers by email:

m.i.g.essers@utwente.nl or by phone: 053 489 39 93

FROM THE BROAD BACCALAUREATE TO THE BROAD BACHELOR'S

EDUCATION IN THE TWENTE

The Twente Education Module (TEM) is very contemporary, with its modules, personal responsibility for students and cooperation in joint projects. Previous education models, such as the general foundation course and the baccalaureate were similar: they were practical and had a broad scope. Here are alumnus Leen Noordzij and Creative Technology student Pamela Shamentaj on the TEM. BY Hans van Eerden PHOTOGRAPHY Rikkert Harink

LEEN NOORDZIJ (73) was the first engineer to graduate in 1969 from the Technical College Twente (THT). After graduating from an institute of technology with a degree in mechanical engineering and doing military service, Noordzij decided to continue his studies at the brand-new Technical College Twente. It was the pioneering spirit at Twente that appealed to him. "In the first year, the general foundation course, I was able to catch up on my physics and chemistry." He then took a baccalaureate in Mechanical Engineering. "We had subjects like mechanics, fluid mechanics, materials engineering and production technology – all of them at a much more fundamental level than at the institute of technology. I found it fascinating. I had exemptions for drafting and the workshop because of my previous education, so for me the emphasis was on creativity. I loved every minute of it."

Noordzij took as many subjects as he could, but at the same time he had quite a few exemptions, so he started work as student assistant. Student life never really appealed to him. "I had drunk enough alcohol during my military service." Still, he was one of the founding members of the Isaac Newton study association; he even became its president. After graduating in the field of fluid mechanics, he did PhD research under the supervision of Professor Leen van Wijngaarden. "He was my teacher and mentor. His view was: now you are at the technical college, take all the subjects you can. That's what I did. I took quantum chemistry, theoretical physics and all the courses available in maths. We also had subjects in the social sciences such as general economics and operations research, as well as philosophy and sociology."

Students could enter the labour force with their Twente baccalaureate after studying for three and half years. But according to Noordzij that was not a good idea. "Almost all students went for a graduate engineering degree." However, he has positive memories. "The general foundation year and the broad baccalaureate helped me a lot." In the end, Noordzij became the managing director of Gastec in Apeldoorn (currently a subsidiary of Kiwa, ed.). "I always felt that I could talk to staff about the technical side of the company."



"Almost all students went for a graduate engineering degree"

REGION THEN AND NOW



“Still has time for other activities”

PAMELA SHAMETAJ (20) is from Albania and started studying at the University of Twente in 2014. She looked online for a full degree course in English with a broad technical profile to suit her broad range of interests. She found the UT Bachelor's in Creative Technology. “This degree programme is about creativity, practical assignments and innovation, things that I am good at. The people are friendly and creative, and that inspires me a lot. In Albania, tutors are much more authoritarian and are less flexible and approachable. The classes at the University of Twente are interesting, and each module has carefully selected guest lecturers.” The division of subjects into modules which match the central project suits the programme well, says Ms Shametaj. “It is very intensive, with lots of coursework, which means students have to work in the weekends too. Nevertheless, there is room for other activities. For instance, I am a member of the programme committee, which solves practical problems related to the programme.”

She chose ‘smart technology’ as her specialty and wants to use this to continue in the direction of robotics. “I’m particularly interested in biorobotics, for instance building exoskeletons which support people with physical impairments. Creative Technology gives you a good foundation in robotics, with its broad scope and attention to the design aspects of human-robotic interaction. That’s the area I want to explore in my Master’s, but first I want to get some practical experience in an operations-driven organization after completing my Bachelor’s.”

Pamela Shametaj is very positive about the Creative Technology programme and the Twente Education Model, but ‘as usual’ there is always room for improvement. “There’s really no point in redoing a whole module if you fail a single test. You’ve already acquired most of the knowledge. And the timetable could be organized better.” Nevertheless, she has already recommended the programme and the University of Twente to her friends. “In Albania, the universities are mainly geared toward theory, while the University of Twente focusses more on practical assignments. Whatever you learn here can be put into practice right away.”



www.utwente.nl/tom/en/

MOOC is a new form of online education. Two years ago, the University of Twente started putting its courses online. Now, two MOOCs, which have attracted thousands of participants, are available on the British FutureLearn platform. BY Hans van Eerden PHOTOGRAPHY archief

UT BOOSTS ITS ONLINE PRESENCE

The first University of Twente MOOC (Massive Open Online Course) to go online was 'Ultrasound imaging in Technical Medicine (TG)'. Jordy van Zandwijk acted as coordinator and tutor during its development. "We wanted to advertise the Technical Medicine philosophy and make technology comprehensible to medical professionals. To do this, we restricted ourselves to ultrasound imaging, a subject on which many Technical Medicine researchers and tutors are knowledgeable. We showed the separate medical and technical sides of ultrasound using concrete cases."



MOOCs make free education available to a wide audience. They are not interactive online tutorials, but rather complete programmes with a mixed media approach including videos, articles, quizzes, tests and group discussions. They can be 'consumed' in one go, but at a normal pace the average course will require three hours a week for six weeks.

'Social learners'

The Technical Medicine MOOC was under development for a long time. "There are a lot of things we had to find out for ourselves." This happened in close cooperation with University of Twente education experts from the Centre for Expertise in Learning and Teaching (CELT) and external experience experts. It was presented for the first time in October 2015 on the British FutureLearn platform. "6,300 people from all over the world signed up, 2,500 of which looked at several parts of the course, and 1,200 of which became social learners: they took part in the discussions or asked questions. In the end, 250 fully participating learners made it to the finish line." The second MOOC, 'Supply chain innovation', started last January and attracted 8,400 people. In May, a second edition of 'Ultrasound imaging' began, as did a third MOOC, on e-Health. A fourth MOOC will follow this autumn, dedicated to nanotechnology, specializing in early diagnostics.

Unexpected opportunities

The experience we gained with the Technical Medicine programme has been passed on to the new MOOC teams and CELT. "It is a great way for the University of Twente to raise its profile," says Eduardo Hermesen of CELT, "The videos are partly shot outdoors on the campus, and they drive innovation in the field of education. Lecturers are experimenting with new forms of education." Sometimes it leads to unexpected opportunities. "Jos van Hillegersberg, professor in business information systems, was recently invited to speak at AkzoNobel in Hengelo: it turned out that their staff had followed the 'Supply chain innovation' MOOC."

Discussion

Professor Hermesen sees room for growth. "We need to streamline the design process to make it cheaper and quicker, and we need to keep experimenting. For e-Health, there is more focus on the structure and the quality of texts and video scripts. 'Nanotechnology' videos will be shorter than the earlier MOOC videos, in an attempt to reduce the number of dropouts. A new development is the possibility of bringing participants together in smaller groups to stimulate discussions among them." Professor Hermesen does not expect there to be much debate on whether or not to continue producing MOOCs. "Massive Open Online Courses are becoming a permanent fixture in the online education environment."

The second edition of the CuriousU summer school is going to be bigger. The number of courses this year has grown from eight to fourteen. The first participants have already signed up. From Uzbekistan to Ghana. BY Lidewey van Noord PHOTOGRAPHY Archief

SUMMER SCHOOL



MORE PARTICIPANTS, A MORE EXTENSIVE PROGRAMME

“Students from all over the world are signing up,” CuriousU project leader Rianne Kaptijn tells us. “From China, Indonesia, Ghana, Mexico, Uzbekistan, Brazil, Canada, the list goes on and on. A diverse, international group. They will sleep on campus, in tents, cabins or in the international student rooms. The best thing is that all these students from different colleges will become future ambassadors for the University of Twente.”

The successful summer school formula combined with a festival will remain unchanged. “Every day starts with breakfast together and an inspiring lecture,” says Ms Kaptijn. “Science journalist Ionica Smeets will humorously reveal the errors in reasoning in day-to-day life. David Abbink, associate professor of Mechanical Engineering at Delft University of Technology, will give a lecture on the interaction between man and machine. Another speaker is Ruben Wegman, CEO of NEDAP, a company on a mission to improve the world using technology. And the Dutch-American comedian Greg Shapiro will

explain which traits of Dutch culture the participants will encounter in the course of the week.”

The participants will determine which courses they will take by filling in their own timetable. “All the workshops are linked to research at the University of Twente,” says Ms Kaptijn. They can choose between Health and Happiness, Design and Construct the Future, Risk Management, Serious Gaming, Smart Cities, Water and The Future of Health Technology. “Students can prepare for the next academic year at the summer school for example by following the Brush up your Maths or Introduction to Academic Writing course or taking a Dutch-language or academic English course.”

Festival

And there is plenty of opportunity to unwind and attend social activities, says Ms Kaptijn. “For instance there are sports and games scheduled during the lunch breaks and various excursions on the programme. On

Saturday, the students have a day off, so that they can visit Amsterdam for instance.”

CuriousU will take place during the Olympic Games. Ms Kaptijn continues, “We have taken this into account by organizing a big TV screen so that students can watch the Games. On Friday evening, a live band will make the festival complete.”

“All the workshops are linked to research at the University of Twente”

More applications than expected

The programme is more extensive than last year’s, partly because more participants are coming. Ms Kaptijn concludes the summer school is a unique opportunity to show which area of research the University of Twente is involved in and the knowledge we have. And we also make full use of the facilities like the labs, the campus and the sports facilities.”

● CuriousU is scheduled to take place between Sunday 14 August and Tuesday 23 August.

Micro insurance against drought should encourage farmers to invest in increasing yields from their land. Kees de Bie, senior lecturer at the University of Twente's Faculty of Geo Information Science and Earth Observation (ITC) is helping an insurance company set up its geo data system. BY Hans van Eerden PHOTOGRAPHY Arjan Reef

MICRO INSURANCE HAS HUGE IMPACT IN ETHIOPIA

Satellite pictures indicating how green a farmer's land is can be used to determine whether there is a drought. This information is central to the GIACIS project (Geodata for Innovative Agricultural Credit Insurance Schemes) in Ethiopia. Just like in many other countries, agriculture there suffers from a yield gap. Kees de Bie wrote his dissertation on the phenomenon. "The actual

"Using satellite images you can follow the growing season and determine whether there are any negative variations, like drought"

yield is often much lower than would be economically viable. If farmers want to realize an increase in yield on their small plots, they have to invest in good seed, artificial fertilizer, better cultivation techniques, and so on. Many farmers, however, are hesitant to ask for credit because they fear not being able to pay it back if the harvest fails, which may happen in times of drought.

Micro insurance to compensate farmers in the case of drought can remove some of these fears."

How green?

Payment criteria are crucial to insurance policies. Yields which are too low seem a logical criterion, but this can depend on many more factors other than just drought. Not enough rain is an obvious criterion, but placing a rain gauge on every farm is impractical to say the least. Measuring how green the land is can be easily done, however. And that is where De Bie and his ITC faculty come in. "Since 2000, I have been working on the use of geo-information systems and remote sensing to complement the existing monitoring of ground use. You can use satellite images to look for any negative variations, like drought." The Normalized Difference Vegetation Index can be used as an indicator, showing to what extent the land is covered with vegetation, like grass, corn or beans.

15 million insurance policies

GIACIS is a public-private partnership between the Ethi-



FOOD SECURITY

Kees de Bie studied tropical agriculture at Wageningen University and worked for the World Food Organization FAO in Pakistan and Ethiopia. In 1991, he joined the ITC Institute of Geo Information Science and Earth Observation, which has now become a faculty in its own right at the University of Twente. A great deal of his research and international projects – collecting geo data and translating it into recommendations – is related to food security. “My colleague Andy Nelson gave a speech on the subject (see box, ed.). Population growth calls for an increase in food production, which we are actually unable to keep up with. This is why drought can have such an enormous impact.”

opian government, the local financial services provider Kifiya and partners like UT’s ITC. Dutch government financing – for three years, after which the project has to pay for itself – comes from the G4AW programme (Geodata for Agriculture and Water), which uses satellite data to improve food certainty in developing countries. The project is already halfway, explains De Bie. “All software and algorithms have been developed, the partners are ready and the salespeople and managers have taken training courses. The first insurance policies have already been sold and the goal is to sell 200,000 policies by the end of the year. In five years’ time, we hope that around fifteen million will have been sold. In addition, other insurance policies against risks like flooding or sickness are also an option. Interest has also been expressed from other countries.”

Mr De Bie calls it a unique, large-scale project. “A resounding success, the result of ten years of investment in research. GIACIS is meeting real demands from the private sector and the government in Ethiopia.”

Spatial data

Andy Nelson, Professor of Spatial Agriculture and Food Security at UT’s ITC Faculty of Geo Information Science and Earth Observation, delivered his inaugural lecture in late April. He spoke on the need for ample and safe food for a world population which is growing towards 7.5 billion people. “We really have to take steps towards well-argued policy for where, when, how and how much food we can produce.” Professor Nelson sees many opportunities to use location specific data-driven solutions to help secure food safety and access. “There is a huge quantity of relevant spatial data available which is valuable for making decisions on increasing the yield of agricultural land. We can make that data available to a large audience.”

IN THE LAB

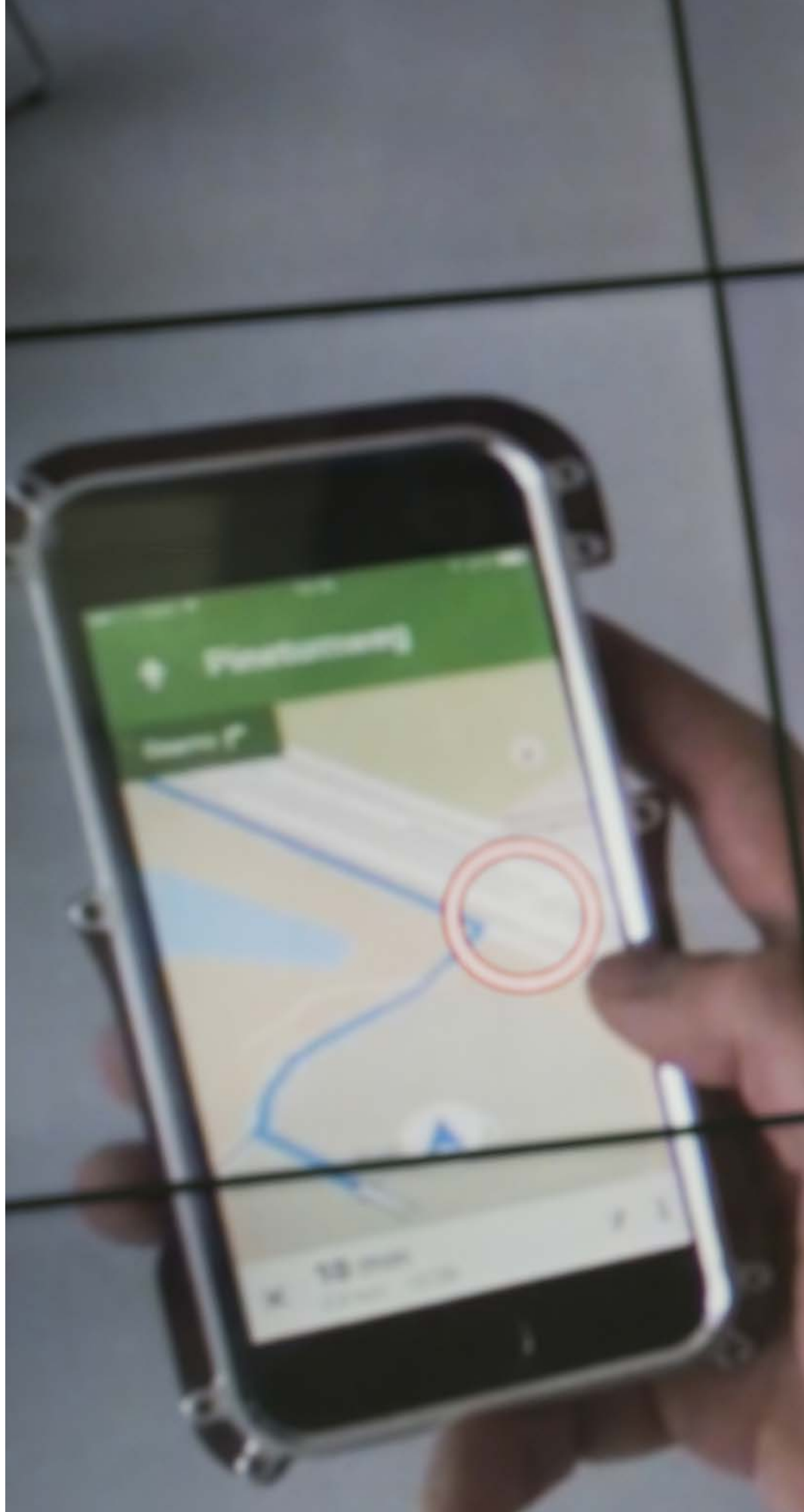
Name **Peter Slijkhuis**
Age **22**
Position **Master's student in human factors & engineering psychology**
Lab **Tech4People (Designlab)**


BY **Marco Krijnsen**
PHOTOGRAPHY **Arjan Reef**

Behavioural scientists are becoming more and more interested in technology. They understand that the use of modern devices can provide valuable new information on human behaviour. The recently opened Tech4people research lab is meant to bring engineers and behavioural scientists together. Technology meets science.

Peter Slijkhuis is in the lab to experiment with a pair of eye-tracking glasses, which can register the eye movements of the wearer thanks to four tiny cameras. "One of the things you can use it for is to see which product packaging appeals most to a consumer, or to find out what triggers shoppers when they walk through a shopping centre. At the moment, I am supervising a PhD candidate at the ITC (Faculty of Geo-Information Science and Earth Observation) with card testing using eye-tracking. This could help make the cards easier to read."

Mr Slijkhuis is developing a manual for eye-tracking glasses (TobiiPro Glasses 2) as a guide for researchers. And there are other facilities (wifi trackers, sensor suits, social metric devices) which the Tech4people lab's behavioural scientists and engineers can support organizations with. "The devices help us to understand group behaviour and to deal with crisis situations better, like in a full football stadium for instance," says Ellen Giebels, professor of Psychology of Conflict, Risk and Security and co-founder of the lab.



A man with short brown hair and a light beard is wearing clear, futuristic eye-tracking glasses. He is looking down at a silver smartphone with a brown leather-like case that he is holding in his right hand. He is wearing a black button-down shirt. The background is a blurred, modern interior with a grid pattern, possibly a shopping center.

"You can use eye-tracking glasses to find out what triggers shoppers when they walk through a shopping centre"

Peter Slijkhuis wearing a pair of eye-tracking glasses.

FROM FOOTBALLER TO

The combination of professional football and academia brought Marnix Smit nationwide fame. The public administration expert, who has spent half of his life at the University of Twente, is now working as a subsidy consultant. **BY Marco Krijnsen PHOTOGRAPHY Rikkert Harink**

Marnix Smit, who was born in Almelo, was a talented football player in the early 1990s. He was selected to play in FC Twente's youth side and, like all boys that age, he wanted to reach the top: a place on the first team. However, while school came in second place for the other boys, Smit insisted on going to university after passing his final exams and gaining a pre-university education certificate (VWO). "You know the chances of making it as a footballer are slim. Only one or two players from every youth team at FC Twente make it onto the first team. I wasn't prepared to take that risk.

And neither were my parents." Nevertheless, Smit clearly kept the door open to a career in football, because he chose to study at the University of Twente. That limited the distance between the lecture halls and the training field. When, after a couple of months, it turned out that electrical engineering was not for him, Smit switched to studying public administration. He was allowed to take six years rather than the usual four to graduate. Had this not been the case, it would have been impossible for him to continue his studies, because in the meantime he had made it onto Heracles

Almelo's first team as defender. It would prove impossible to keep football and his studies separated. "I completed my degree with an internship at the Municipality of Almelo. My colleagues came to watch every home match. If we lost, I had to explain myself at work on Monday morning..." At that time, football took first place. Initially Smit wasn't really considering continuing his studies at university. But Mirjam Bult-Spiering, who was assistant professor at that time (now a member of the executive board, ed.), as well as Smit's thesis supervisor, persuaded



SUBSIDY CONSULTANT

him to continue his research at the University of Twente into public-private partnerships in the building industry. "The topic was a relatively new field. I thought it would be interesting to further specialize in it, but believed I wouldn't have time for it alongside my football career. But Mirjam indicated that there would be plenty of flexibility with regard to weekly planning and offered me the opportunity to develop as a researcher."

Test tubes and a lab coat

Smit assisted Bult-Spiering with her PhD research into public-private partnerships and with her teaching

duties. In 2002, he started his own PhD supervised by Geert de Wulf, professor of Planning and Development at the time. This was a special period in Smit's life, especially when Heracles was promoted into the Dutch Eredivisie (Premier League) and the intensity of the training increased.

"I lived in two totally different worlds. I didn't even try to explain to my teammates what I did at the university. They thought I ran around in a lab coat every day with test tubes in my hands. I loved switching between the football field and academia. The only disadvantage was that I hardly had any free time any more. When I wasn't playing football, I was at the university. My weeks were jam packed. I simply didn't have time to do anything but work."



PUBLIC ADMINISTRATION EXPERT FINDS SUBSIDIES

Marnix Smit (Almelo, 1975) studied public administration at the University of Twente from 1994 until 2001. He gained his PhD from the Faculty of Engineering Technology in 2010 on the topic of guaranteeing public interests in public-private partnerships. Smit was also a professional footballer for Heracles Almelo during the period 1999-2009.

Since 2015, Dr Smit has been consultant and team leader at Vindsubsidies, part of the IDOX Group, an international organization which is mainly active in the area of information management. The company advises and assists large and small organizations with applications for and the management of subsidies. The company has a database containing more than 3,500 national and international subsidy schemes which are hosted daily by the five staff at Vindsubsidies. Many companies, municipalities and knowledge institutions have subscriptions to this database.



Balance of interests

After his PhD, Smit started post-doc research into the repurposing of historic buildings. These processes are also about striking the right balance between the different interests. The authorities may want to retain the characteristic elements of an old factory or church for instance with regard to its responsibility towards sustainable spatial development. While at the same time, it has to keep costs down, because otherwise market parties will not be able to viably exploit a building. The answer lies in bringing in other parties in order to come to a creative solution.

All the players have to give a little to make the partnership a success, is Smit's conclusion. "Property developers only want to see one thing: a return on their investment. Cultural historians want to retain as many of the building's characteristics as possible so that its story can be told to future generations. Local residents mainly look at the significance and impact of the building

with regards to their local area. Banks or other investors want to see the income from rent guaranteed, but that is difficult with cultural heritage buildings. Often it is impossible to find finance for a building on the basis of a phased development model with several uncertainties. And the authorities are usually stuck in the middle, having to secure wider public interests, while they often don't have a clear picture of what those are exactly. Eventually, the different parties will have to make concessions in order to ensure successful repurposing."

Doctor/footballer

For a while it looked like Marnix Smit would write history with his PhD. He would have been the first professional footballer to have a PhD title. But when, in 2009, a place in the starting line-up at Heracles became more and more unlikely, he ended his career in professional football. A year later, he finished his PhD research in public administration. Afterwards,

he continued to work at the University of Twente as a researcher and tutor. In 2015, he was transferred to Vindsubsidies, part of the IDOX Group. In many ways, Smit has kept close

"I loved switching between the football field and academia"

to the University of Twente. Soon he will move into a house a short bike ride away from the campus, together with his wife Carmen, -who is head of department at the university's LISA Service Centre. He has also stayed in touch with his old colleagues, including Mirjam Bult-Spiering and Geert de Wulf. Furthermore, he is supervising PhD candidate Marlijn Baarveld, who works for the Dutch government's Cultural Heritage Agency and is doing research into the redevelopment of cultural heritage.

AN ODE TO 55 YEARS OF THE UNIVERSITY OF TWENTE

To mark the occasion of the 55th anniversary of the University of Twente, it has fallen to me to pay tribute to the impact our university has had over the years. As I have not been around for the whole 55 years – although in the meantime I have witnessed many of them – I looked at a number of eminent University of Twente tutors and alumni from today and from the past. From the many suggestions, I have selected five. Each and every one of them is someone who, perhaps unexpectedly or in a less well-known way, has had an impact on science and society.

Firstly, I named Piet Bergveld, inventor of the ISFET: the Ion Sensitive Field Effect Transistor, which can measure chemical concentrations electronically. He began by sawing off the ‘lid’ of a transistor. Fellow researchers declared him mad, because it’s the cover that is actually meant to protect it. Nowadays the ISFET is an essential part in a chip with no less than 660 million ISFETs being used in the DNA analyser of the Ion-Torrent company. There are also examples of discoveries which have an impact on science itself. Mathematician Arie Duijvestijn solved a well-known mathematical problem: one of the 193 problems from ‘The Scottish Book’. The question reads: “Can a square be divided up into squares with different measurements to one another?” In 1962, Mr Duijvestijn showed that this could only be done with no less than 21 squares. However, he was only able to prove that this really is possible with 21 squares using a computer in 1978.

And as I myself have been asked to pay tribute to the university, then I have to name my own tutor. Hans Achterhuis, Philosopher

Laureate of the Netherlands a few years back, was professor of philosophy at the University of Twente for many years. He reinvented what philosophy could mean to a technical university. Not philosophy but philosophy which takes its cue from technical practices and the societal impact of technology. His thoughts on ‘the moralization of machines’ had a huge impact, both on the formation of philosophical theory and design practices.

There are also people still at the University of Twente, who have an impact. Bram Nauta, for example, Professor of Integrated Circuit Design, who designed a circuit at the end of the 1980s which turned out to be indispensable in electronic devices and which carries his name. This so-called ‘Nauta circuit’ filters out noise from signals, by neutralizing noise with noise. Thanks to Nauta’s work mobile phones use less energy, the speed of data transport is faster and the quality of the signal is better.

And Arjen Hoekstra needs to be mentioned too. In 2002, he developed the ‘water footprint’: the water footprint of a person or company. This footprint is the total amount of freshwater which is used to produce all the goods and services consumed by a person or a company. An instrument which is helpful to decision-making and gaining insight into complex processes.

Scientific complexity and social relevance appear to go hand in hand throughout the history of the University of Twente. Perhaps that is the biggest impact we have had in the past 55 years: pursuing technology in a way that is central to society, and combining high-quality research with meaningful contributions to the challenges faced by today’s society. ●

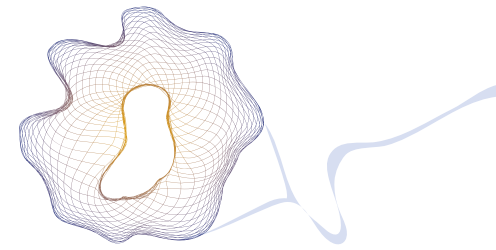


“SCIENTIFIC COMPLEXITY AND SOCIAL RELEVANCE APPEAR TO GO HAND IN HAND THROUGHOUT THE HISTORY OF THE UNIVERSITY OF TWENTE”



PROF. P.P.C.C. (PETER-PAUL) VERBEEK, PHD (1970) IS UNIVERSITY OF TWENTE PROFESSOR OF PHILOSOPHY OF MAN AND TECHNOLOGY.

IN BRIEF



NEW MATERIALS

Nano engineers at the University of Twente have succeeded in creating materials in which the direction of magnetism can be influenced according to preference and which can be controlled accurately. The researchers piled various thin layers of perovskite materials on top of each other with an inbetween layer which was only 0.4 nanometres thick. By varying the location where the inbetween layer is placed, they were able to choose the direction of magnetism throughout the material. This could be useful for finding new ways to create computer memories and for spintronic devices – a new form of electronics which works on the basis of magnetism, rather than electricity.



FLOURISHING

People who 'flourish' are happier, more productive, they report sick less often and have lower risk of suffering from mental disorders. Two thirds of Dutch adults are not flourishing right now, according to a study by the Netherlands Institute of Mental Health and Addiction, the Trimbos Institute. Research by the University of Twente has shown that this can be ameliorated by a course based on positive psychology. After the course, participants had significantly less symptoms of depression and anxiety, compared to the control group. The effects of the positive psychology course were detectable for at least nine months.



ROBOTIC ARM

The muscle disease Duchenne occurs in around one in five thousand boys. The muscles of these boys become weaker and weaker, until they can no longer use their arms properly. Researchers at the University of Twente, together with VU University Medical Center,

Delft University of Technology and the Radboud University Medical Center, have developed a prototype of a robotic arm. This inconspicuous aid can be worn under clothing and supports people with Duchenne muscular dystrophy in their daily activities.

INSPIRING WOMAN

At the University of Twente, everyone has known for a long time that Vanessa Evers, professor of Social Robotics, is an inspiring woman. Now more and more people both at home and abroad are seeing this too. Take Inspiring Fifty, a platform for women in technology, which has published a list of the fifty most inspiring European women involved in technology. Professor Evers is one of the five Dutch role models on the list. Feminist magazine Opzij & business magazine The NextWomen compiled a list together of 25 women who make a difference in the digital world. Professor Evers' name also adorns this list. Furthermore, she received the Academic Society Award from the Royal Netherlands Society of Engineers.

Professor Evers won this award for the engaging way she manages to make the connection between science and society.



WATER SHORTAGES

Four billion people on earth struggle with severe droughts for at least one month of the year. This has been shown in a very extensive, long-running study by University of Twente professor of Water Management Arjen Hoekstra. It is the first study to chart the water footprint of man from month to month and link it to the monthly availability of water.

Up to now, scientists estimated that two to three billion people suffered from severe droughts "However, they only looked at the availability of water on a yearly basis. This gives a more positive, but inaccurate picture, as it is during dry periods that droughts take place," Professor Hoekstra explains. Mexico, the west of the US, northern and southern Africa, southern Europe, the Middle East, India, China and Australia in particular suffer regularly from direct shortages of drinking water or their industry and agriculture are affected by droughts.

LIFETIME OF PIPES

There are around 80,000 kilometres of gas and water pipes underground in the Netherlands, made from unplasticized polyvinyl chloride (PVC). When these pipes were laid in the 1960s, their lifetime was estimated at fifty years. Some of the pipes are due to be replaced, while others can last for many more decades. Network operators desperately need a suitable method to determine how long a pipe will last, so that they can take preventive action at the right moment. University of Twente PhD candidate Emiel Drenth has developed a method to measure the remaining lifetime of the pipes. His method looks at the micro-hardness of the pipes, which can be determined by indentation tests. The indentation tests do not damage the pipes.



For further information on all these items, see our renewed website www.utwente.nl.

“WHERE WONDERFUL INTERACTION TAKES PLACE”



After finishing their degrees, the University of Twente’s alumni spread out across the country. Anyone who wishes to get or keep in touch with other former University of Twente students can join one of the alumni circles. Like the one in Utrecht.

Martijn van der Veen (public administration 2004) has been an active member of the alumni circle in Utrecht for a number of years. He is the founder and owner of Procis, and organization consultancy specialized in

“An alumni circle is a low-threshold way to meet fellow former students and to build up a network of people”

privacy legislation. “Alumni in a particular region form the alumni circle. You do not need to join, you are already a member. We share the same background, but after their degree everybody follows their own path of course. These people are able to meet up or get back in touch through an alumni circle.” Everyone can help out. Mr Van der Veen was helped by Marcel van den Elst (electrical engineering 2003), who has been in business since 1999 in the field of internet technology geared to improving processes in organizations. Mr Van den Elst: “Because we all studied at the University of Twente, you can strike up a conversation with people you do not know. The meetings are good for business too, we regularly see wonderful interaction taking place.”

“Going back in June”

In Utrecht, sometimes twenty people turn up to an event and other times we see a hundred and fifty. Mr Van der Veen says, “We try to be a platform for meeting up. Our events have a broad scope, sometimes they are linked to the work we do. For instance, once we organized a coaching café for everyone who wanted to take steps in their career or was wondering whether they were on the right track. We talked in small groups supervised by career coaches about the possibilities.” He continues: “We also organize social events with drinks, wine tasting and city walks in Utrecht.” Mr Van den Elst describes the company visit to bol.com with enthusiasm. “It was great to see inside such a high-tech internet company – normally you do not have access to places like that. University of Twente alumna Frederieke Ubbels is the IT manager and she organized four interesting presentations by other alumni who work there and drinks afterwards. It was such a success that we are going back in June.”

The initiative for the events comes from the members themselves. Mr Van der Veen explains, “Ideally someone else takes on the organization for each event. We are all professionals. You can usually set up an event on your own. A city walk can be organized with two telephone calls. You can always ask for help to set up a bigger event. For instance, we held the preliminary rounds for TEDxTwenteU, that took a little more time, but it was really great listening to the various speakers. If everyone helps out, it is not a lot of work.” Right now in Utrecht, we

are setting up a theme evening on the railways. Mr Van den Elst: “We asked the alumni office if there were former students who have jobs with companies connected to the railways. Who knows we may get a tour of a place where no one else comes.”

“Making new contacts”

For many former students the university’s city, Enschede, is not next door so an alumni circle is a low-threshold way to meet fellow former students and to build up a network of people outside your own profession or trade association. Mr Van der Veen continues, “An alumni circle is actually a random cross section of people with the same interests and level of education. After graduation, everyone develops and gains new insights. As a person, you grow. Because of this it is really interesting to exchange experiences.” Mr Van den Elst adds, “Also, you meet alumni of all ages. Some of them have just graduated and others hold high positions in all kinds of companies. I make new contacts at every meeting.”

Do you want to be informed about alumni events organized by an alumni circle in your region or you want to organize an event yourself? Go to www.utwente.nl/alumni or contact Joe Laufer, alumni relations manager, directly (j.laufer@utwente.nl).

TWENTE VISIONARIES FUND

A number of prominent University of Twente alumni intend to set up a unique investment fund, the Twente Visionaries Fund (TVF). The TVF is geared to investors who are interested in the application of high-tech solutions in commercial products and services which are hugely relevant to society.

The fund will invest in ground-breaking medical technological research projects with huge potential impact, and in 30 to 40 existing and promising startups. The investments will focus on areas in which the University of Twente plays a leading role: nanotechnology, information and communication technology, medical technology and specifically the areas where these disciplines overlap. In other words, areas in which the University of Twente is unique and distinguishes itself.

What is special about the Twente Visionaries Fund is that it is an initiative for alumni by alumni. Alumni can participate in this fund in two ways. Firstly as investors with a view to financial profits, and with the added benefit of supporting their Alma Mater in its ambitions in the areas of research and entrepreneurship.

Secondly, they can participate as advisors and networkers in the fund's pool of experts, as executive board member or supervisor of the fund, or as 'foster parent' of a startup. The fund will create a unique network which not only invests, but also supports the university and startups with advice and assistance. The active alumni will form an exclusive, closed network of friends.

For more information, please contact Tjeerd de Vries, Class of '64: 06 520 757 37, t.j.de.vries@alumnus.utwente.nl

UT ALUMNI ON THE MOVE

■ In April 2016, **Pim Arends, TW'00**, started working as Senior Treasury Officer for the Dutch development bank FMO. Prior to this he fulfilled various positions at the Royal Bank of Scotland (RBS).

■ As of March 2016, **Mick Beekhuizen, TBK'00**, became Chief Financial Officer at Chobani, America's largest Greek yoghurt maker. He previously worked for Education Management Corporation EDMC and Goldman Sachs.

■ **Maarten den Braber, BIT'05 and IE&M'08**, is co-founder and as of 2016 Chief Operations Officer of the Dutch branch of Singularity University, a research institute. He was previously employed as Program Director of Digital Health at Rockstart Accelerator in Amsterdam.

■ In January 2016, **Rolf Fouchier, WB'95**, former CEO at Eon Benelux, started his own company Exceleration, which helps small and medium-sized companies realize growth.

■ As of May 2016, **Ferry Haris, BIT'10**, is IT Audit Manager at TNT. His previous employers included Heineken, Deutsche Post DHL and Deutsche Telekom.

■ **Ruben Heerdink, BIT'09 and Vincent Hoogsteder, BIT'07**, became co-founders of Omniaxt in April 2016. They were also two of the four co-founders of Distimo, a University of Twente spin-off which was sold in 2015.

■ **Daniel Hofman, TN'03 and TW'03**, became Senior Director of Business Value at Salesforce in January 2016. Previously, he worked for Oracle, The Boston Consulting Group and Accenture as well as other companies.

■ **Matthijs van Kampen, CT&M'04**, has held the position of Corporate Responsibility Manager at T-Mobile since April 2016. Previously, he worked as Account manager at Convenantbureau Gezond Gewicht, as policy officer for the Ministry of Housing, Spatial Planning and the Environment (VROM) and as consultant at Corgwell.

■ As of July 2016, **Marco Piët, CT&M'00**, will be managing director of water management at Royal HaskoningDHV

in Jakarta, Indonesia. He has already been employed at Royal HaskoningDHV in the Netherlands for a number of years, and at DHV before that, prior to the merger in 2012.

■ From the beginning of January 2016, **Maj-Britt van Raalte, CS'09**, is senior press officer at Air Traffic Control the Netherlands (LVNL). Previously, she worked for the City of Rotterdam for almost 6 years, as communication advisor from 2009 and municipal press officer from 2014.

■ In January 2016, **Jeroen Ringlever, IE&M'14**, was appointed Revenue Specialist at Transavia Airlines. Previously, he worked as Supply Chain Young Professional at YSE.

■ **Machiel Tiddens, WB'00**, became ah.nl Senior Director of E-commerce at Albert Heijn as of January 2016. Previously he worked for bol.com as Managing Director of bol.com Plaza, and before that for Bacardi and Heineken as well as other firms.

■ In March 2016, **Yana Volkovich, PhD EWI'09**, started at AppNexus as Senior Data Scientist. She previously worked for Eurecat - Centro Tecnológico de Catalunya, Cornell Tech and Barcelona Media Research Foundation.

■ Since February 2016, **Annick de Vries, PhD BMS'08**, has been employed as senior policy officer for the Director General of Energy, Telecom and Competitiveness at the Ministry of Economic Affairs. Before that she worked for the research institute Rathenau Instituut and consultancy Twynstra Gudde.

■ **Kodo Yokozawa, PhD BMS'12**, has joined the Yokohama National University in Japan since April 2016 as Associate Professor. Earlier he worked for more than three years at the University of Hyogo (Faculty of Business Administration)

You can follow news about alumni on Twitter (@alumniUTwente). If you or someone you know has a new job or has won an award, please let us know: alumni@utwente.nl

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Tjeerd de Vries, one of the promoters.

UNIVERSITY OF TWENTE GRADUATES DO WELL

The WO Monitor is a biennial national survey among recent Master's graduates at Dutch universities. Two years ago, the WO Monitor changed its name into 'National Alumni Survey' (Nationale Alumni Enquete). Last autumn, the response from University of Twente graduates was above average, placing the University of Twente in fourth place with regard to responses. We are also very pleased with the other results.

The survey shows that University of Twente graduates are twenty percent quicker at finding a job than the national average, i.e. within two and a half months, and it appears they find work in their own field of study or a related field more often. In addition, our graduates appear to spread their wings and find work outside the Province of Overijssel. Furthermore it is clear that University of Twente graduates do well!

COLOPHON ALUMNI NEWS

Questions, comments and suggestions: alumni@utwente.nl
Tel. +31 (0)53 489 2104
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BATA4LIFE

Bata4life raised the sum of fourteen thousand euros at the recent 'Batavieren' relay race for the cancer research charity KWF Kankerbestrijding. "Slightly more than last year," says Leon Schipper of the Bata-4life committee. The money was raised in an auction and by the participants themselves "The participants raised the largest amount. The Drienerloos Bier-Dispute FUST team, many of whose team members have been personally affected by cancer, raised the most money, to the tune of 3576 euros.

The NOVA Team from Delft, which raised the biggest amount last year, came in second raising a total of 3360 euros." The money will go to cancer research at Dutch universities, through the KWF Kankerbestrijding charity. You can still make donations to www.bata4life.nl.



Give for a heart
target € 10.000
amount raised so far € 2.428



Give for your heritage:
target € 5.000
amount raised so far € 2.089



Give for talent:
target € 10.000
amount raised so far € 4.430



Give for the Ebenhaëzer:
target € 5.000
amount raised so far € 3.172,24

HELP THESE PROJECTS CROSS THE FINISHING LINE!

The University of Twente Fund Foundation's annual fund raising campaign began at the end of 2015. Under the title "Make the difference!", alumni, relations and (former) University of Twente staff have been asked for a donation to the university's four special projects. We have received more than three hundred donations. Thank you!

Not donated yet? Then we would like to appeal to your generosity: Please help the four projects cross the finishing line! So that Robert Passier can make extra mini-models of the heart from human stem cells via 3D bioprinting. And so that the Kipaji fund can award an extra scholarship to a young talented person from a developing country. So that the shoe boxes of old photos of student life in yesteryear can be digitized and made accessible and so that student sailing club Euros can refit its traditional Dutch flat-bottomed sailing ship Ebenhaëzer for future generations of students.

No preference: € 8.297,50
Total: € 20.415,38

WWW.STEUNUTWENTE.NL

TO HELP US?

Go to www.steunutwente.nl!
Your contribution will go in full to the project of your choice.
Thank you in advance for your contribution!

ISAAC NEWTON RESEARCH TRIP

Twenty-eight mechanical engineering students and two supervisors from the University of Twente left for India on Friday 6 November on the W.S.G. Isaac Newton research trip. The group faced extreme conditions straight away: Calcutta is one of the most polluted cities in the world. And the UT group experienced the pollution first-hand during their tour of the city. The next day, Jamshedpur was on the schedule, better known as Tata City. Steel manufacturer Tata Steel owns almost the whole city. The students visited the blast furnaces and the iron mines. Afterwards they visited the Indian Institute of Technology Kharachpur, where the group attended the Hindustani light festival Diwali.

Then they headed south. The city of Chennai, formerly Madras, turned out to be flooded by severe rainfall. After a few hours' delay, the students visited Apollo Tyres (parent company of tyre manufacturer Vredestein in Enschede), Vik-Sandvik (a ship designer) and the Indian Institute of Technology Madras. The journey continued on the night train to Bangalore, where Shell has a Technology Centre (one of three worldwide) and there is an Albatross factory, a builder of ultralight airplanes. The group ended the visit to this part of India with a day out at a beer brewery, where the students and supervisors enjoyed a pint.





TIM VAN DIJK WINS DE BREED KREIKEN INNOVATION AWARD

Tim van Dijk has won De Breed Kreiken Innovation Award. The Industrial Engineering and Management Master's student won the award and the scholarship which accompanies it for his research project "Teaching children programming".

Mr Van Dijk applied for a grant for his YOU++ project, an online educational platform for children between the ages of 9 and 14, with lessons which combine programming with regular school lessons. Successful pilots have already been carried out in Sweden. The next step is to transfer the knowledge gained in Sweden successfully to the Netherlands and turn it into a sustainable business.

Every year, a vote is held for 'The Voice of Innovation'. The three students/alumni with the most votes receive a scholarship from the De Breed Kreiken Innovation Fund. In addition to Mr van Dijk, Pim Willemsen (MSc. Civil Engineering & Management) and Ingeborg Bikker (PhD in Applied Mathematics) have also won scholarships. The De Breed Kreiken Innovation Award and the scholarships which accompany it were awarded by the De Breed Kreiken Innovation Fund. The objective is to support student entrepreneurs by awarding them a scholarship for their subsequent degree abroad.

The students were given a tour of Nanyang Technological University, an internationally renowned university. At ExxonMobil, they visited the refinery and the chemical plant. The group was also invited by the Dutch embassy to a session with Sander Dekker, the State Secretary for Education. Following questions with the State Secretary, there was an opportunity to speak with him informally, and the students presented him with their research report.

On the last day, the participants visited the van Damen shipyard and spent the night in the phenomenal Marina Bay Sands Hotel.



VAN DEN KROONENBERG AWARD 2016

Gerard van den Eijkel (on the right of the photo) of the company Focal BV has won this year's Van den Kroonenberg Award for young entrepreneurs. The decision to award him the prize was unanimous.

His company Focal is specialized in systems for Computer Vision and Optical Engineering developing industrial inspection systems and measurement systems for high-tech and medical applications.

Van den Eijkel studied engineering physics at the University of Twente and graduated in 1994. In 1998, he gained his PhD at the Delft University of Technology on the subject of pattern recognition. In 2003, he set up his own company as R&D management consultant. Focal was launched in 2008; in this company he was able to combine his extensive knowledge in the field of Vision & Optics with his experience in the area of knowledge-intensive innovation paths. Mr Van den Eijkel is proud, "The Van den Kroonenberg Award is recognition for all of our 23 employees in Enschede and Eindhoven who create innovative solutions for our customers day in and day out. It proves that our optomechatronic systems play an important role in the high-tech industry in Twente." Our company will use the money we have won to further promote the optomechatronic industry in Twente and the Netherlands together with the University of Twente and Demcon as well as other parties.

The Van den Kroonenberg Award is in honour of the former rector vice president of the same name who dedicated himself to turning the University of Twente into an 'entrepreneurial university'. Van den Eijkel received a sum of money and an award, made by Mohana van den Kroonenberg, daughter of the man the award is named after.



MARINA VAN DAMME SCHOLARSHIP 2016

This year's Marina van Damme scholarship has been awarded to Berza Ataoğlu (Turkey, 1982). The jury's decision to nominate Ms Ataoğlu for the scholarship was unanimous.

Ms Ataoğlu started her degree in chemical engineering at the University of Twente in 2005 and she gained her Master's in 2008. According to the jury, Ms Ataoğlu is an example to young Turkish women in Turkey and the Netherlands. In spite of growing up in an environment with little stimulation, she continues to pursue an academic and international university career. As chemical engineer, she is already high on the career ladder in spite of her tender age.

Ms Ataoğlu understands that as winner of the Van Damme scholarship from Turkey and living in the Netherlands and Belgium, she is an important role model to young girls and women in similar situations, for whom pursuing a career is not a matter of course. She wants to use the scholarship to make a new dream come true: to develop her skills in the area of business and management.

The Marina van Damme scholarship consists of a work of art made by artist Mohana van den Kroonenberg and a sum of money to the tune of € 9,000. Marina van Damme, who set up the scholarship, was the first engineer to gain a PhD at the University of Twente in June 1965, when it was still called the Technische Hogeschool Twente (Technical College of Twente). The purpose of the scholarship is to further develop your career.

WOULD YOU LIKE TO ENDOW A NAMED FUND?

You can support the University of Twente by making a one-off donation, a regular contribution or by naming the University Fund as a beneficiary in your will. It is also possible to endow a 'named fund', provided its purpose is in keeping with the general objectives of the University Fund. You decide the fund's name and how its resources are to be spent. The minimum donation required to establish a named fund is € 10,000,-.

More information

See www.utwente.nl/ufonds or contact Maurice Essers on +31 53 489 3993, email m.l.g.essers@utwente.nl

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Former students listened to a round table discussion in packed lecture hall De Waaier. (Photo Rikkert Harink)

On Friday 15 April, around seven hundred alumni found their way back to their student roots. The theme of the five-yearly reunion of former students, which took place for the eleventh time, was based on the courses. A special THT alumni gathering, for alumni who attended the Technical College of Twente, was held in the Amphitheatre attended by two hundred people.

In the morning, guided tours were given of the campus, including a visit to various laboratories, such as the nano lab, the robot lab and the wind tunnel. Visitors were also invited to attend a demonstration in the Design Lab. After lunch, the plenary programme was led by moderator and University of Twente alumnus Diederik Jekel. Afterwards the former students spent an afternoon in their 'old' department together with today's students. Of course, the evening ended with a party.



The first students from the 1960s gathered in the Amphitheatre in the morning for a reunion specially organized for them. (Photo: Rikkert Harink)



The 190 alumni from the very beginning who attended were mainly men. The women could be counted on one hand. (Photo Rikkert Harink)



In spite of the poor weather, over 700 alumni returned to their roots. (Photo Rikkert Harink)



"Look, that's me!" (Photo Rikkert Harink)



Eating lunch and catching up in the Van de Horst Mensa. (Photo Rikkert Harink)



Hot snacks in De Vestingbar. (Photo Gijs van Ouwerkerk)

WERE YOU
THERE?

ALUMNI DAY, A FEAST OF FAMILIARITY



The band members of the Bartenders Reunion, the student band of the 1980s at the University of Twente, got back together for the alumni day. (Photo Arjan Reef)



Back to their studies. How did it go again? (Photo Arjan Reef)



Plenty of catching up to do. (Photo Arjan Reef)



Moderator Diederik Jekel (a frequent guest on Dutch talkshow De wereld draait door) talked to alumni Caes Links, inventor of WiFi technology, Bas Lansdorp, founder of Mars One, and Geert-Jan Bruinsma, founder of Booking.com, about their student days and careers. (Photo Arjan Reef)



Getting a taste of the latest technologies. (Photo Rikkert Harink)

THINK LIKE TURING

BY **Wiebe van der Veen** PHOTOGRAPHY **Arjan Reef**

Escaping from a cell by solving intelligent puzzles: that was the challenge student society Inter-Actief put before University of Twente staff and students in April and May. A shipping container on the O&O square was the scene of a meeting of the minds staged by computer science student, in which teams had to solve a series of challenging puzzles in order to escape. 'Think like Turing' was the motto of this Escape Room: Alan Turing was the British mathematician and computer scientist who cracked the German Enigma code during World War II. The organization reckoned it would take the teams three quarters of an hour to puzzle their way out of the container. A stunning 726 University of Twente participants, in 142 teams, took the challenge. The fastest teams found their way out within a half an hour.

The Escape Room also acted as a temporary laboratory for psychological research, in which sensors recorded the interaction within teams: how do teams work together best? As such, this student initiative fits into the broader context of the 'Living Smart Campus', a large project in which the University of Twente campus is used as a living laboratory. The other projects for instance are on crowd monitoring using smartphones, or on health checks with sensors in which members of the university take part as 'Healthy Heroes'. To make the campus more sustainable, projects have been started such as a competition for the most energy efficient campus flat and a 'Green Office' for sustainable initiatives. The Living Smart Campus is also looking at aspects like privacy, regulations and logistics in order to make the projects successful: a puzzle in itself.





TEDxTwenteU is an event based on the concept of the TED talks. The objective is to bring together intelligent, creative and driven people who hold a talk for a maximum of 18 minutes on an innovative, inspiring and revolutionary idea or topic. The talks in Enschede were filmed and can be seen on the official TEDx YouTube channel. Previous editions reached more than a million people.

David de Meij can look back with satisfaction on the TEDxTwenteU event on 28 April. As co-organizer, he is grateful to the speakers, coaches and activists for their cooperation. "It resulted in inspirational talks on a broad range of subjects," says the student of Human Media Interaction. BY Esther Windt PHOTOGRAPHY Gijs van Ouwerkerk

DEVELOPING SKILLS ALONGSIDE YOUR STUDIES

David De Meij (23) has been a great fan of TEDx talks for years. "That's because of the diversity of topics and the way in which ideas are reduced to their essence." When the opportunity arose to organize a TEDx event at the University of Twente, he was not about to let it pass him by. "I put my name down and became responsible for the speakers and for sponsorship. I made sure that the speakers were given all the support they needed and checked on the preparations for the event." Looking back, he concludes, "It was fun doing it, and you develop new skills when you organize things. I see everything that I learn during my degree programme as a toolkit

for helping me get on in life. Practical skills like negotiating, working together and getting things done are things that you learn by being actively engaged in the community while studying for your degree."

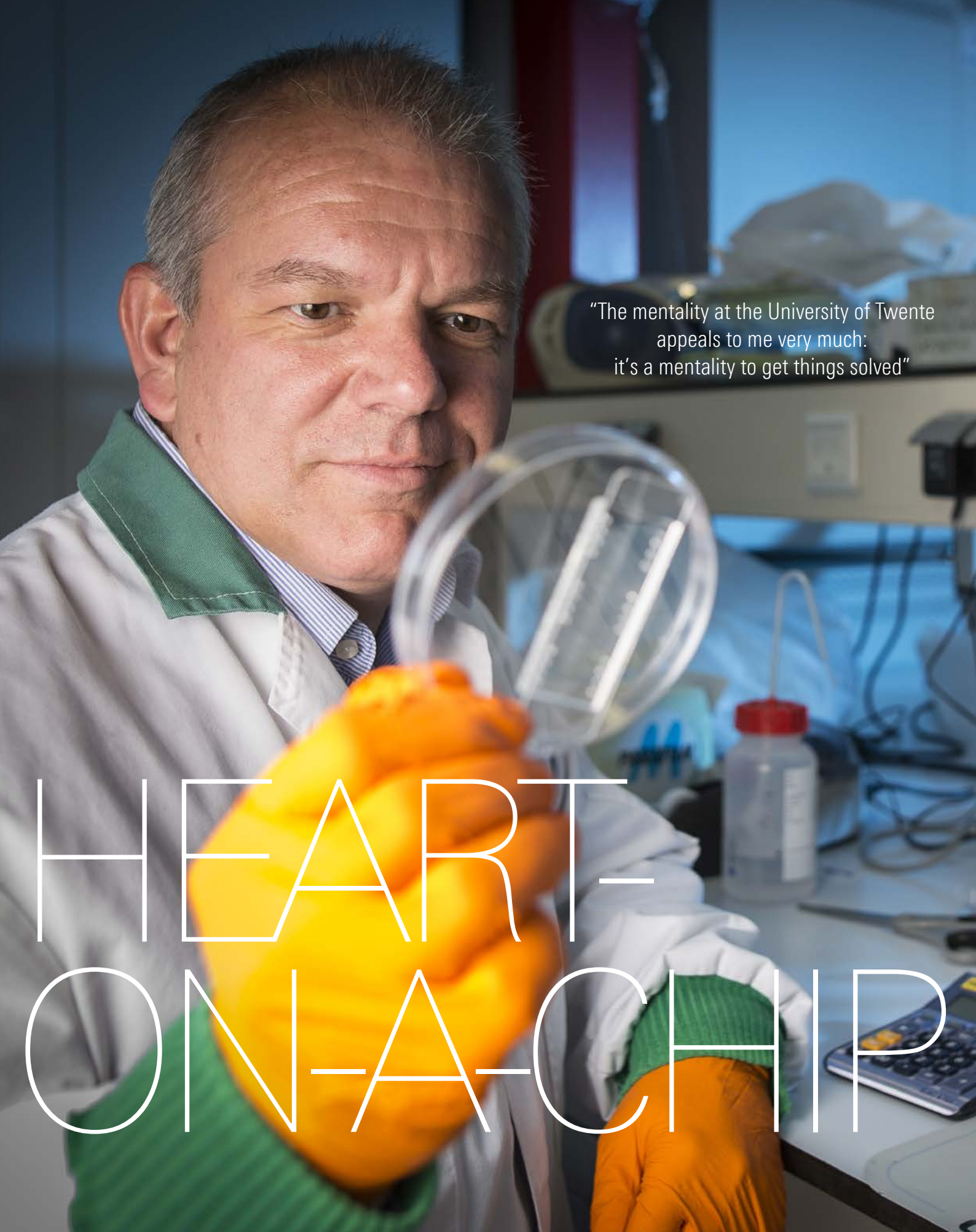
Body language

"TEDx taught me to evaluate all the ideas of the potential speakers: to look at topics that are under-emphasized and that should be given a podium." To make this TEDx event even better than the previous two editions,, all fifteen speakers received training from professional TEDx coaches. "And that could be seen in the talks. The tips from the coaching sessions

really helped to improve the quality. The speakers opened their talks very well and used body language effectively. Furthermore we made good video recordings so we can reach even more people."

Max Welling

His favourite speaker was Max Welling, Professor of Machine Learning. "I was very interested in this topic because of my degree programme. The talk by Professor Welling was about the use of machine learning to save lives. Put simply, it was about recording and using data on health problems to treat illness without violating people's privacy. Very interesting."

A middle-aged man with short, graying hair is shown in a laboratory. He is wearing a white lab coat over a green collared shirt and a blue and white striped shirt. He is wearing bright yellow nitrile gloves. He is looking intently at a petri dish he is holding in his gloved hands. The background is a laboratory with various pieces of equipment, including a petri dish rack, a bottle with a red cap, and a calculator on a desk. The lighting is bright, highlighting the scientist and his work.

"The mentality at the University of Twente
appeals to me very much:
it's a mentality to get things solved"

HEART- ON-A-CHIP

A few skin cells are taken from a patient with a heart defect. Researchers turn them into cardiac muscle cells with which they can make a heart on a chip. This can be used for testing medicines or diagnosing exactly what is wrong with the patient. It may sound futuristic, but this is the technology which Robert Passier, Professor of Applied Stem Cell Technologies, is already working with today. BY **Joost Bruysters** PHOTOGRAPHY **Rikkert Harink**

“My incentive is to understand heart diseases, to make safer and better medicines and to reduce animal testing,” says Professor Robert Passier, who is specialized in stem cells and in particular in how to use them to make different heart cell types. “When you are able to create contracting cardiac muscle cells from a patient with a genetic heart disease on a petri dish, you are able to research the disease or to test the effects of heart medicines.”

Just under a year ago, Professor Passier accepted the position of professor of Applied Stem Cell Technologies at the University of Twente. The idea behind this step is that he can combine stem cell expertise with technologies which the University of Twente is specialized in, such as nanotechnology, micro-engineering, biomaterials and microfluidics. Where these two disciplines converge, an interesting technology emerges: organs-on-a-chip, tiny devices on which you can cultivate cells in a structure which is similar to that of an organ.

One of the projects which Professor Passier is working on is a 3D model of a heart which can imitate the capacity to pump. “Imagine a chip a couple of millimetres long with a few thousand cardiac muscle cells on it. The cells form a kind of cylinder which you can use to pump fluid around the body. Then you can measure the force of the pumping action using sensors and test specific medicines to see if they increase this power.”

Penny drops

When Professor Passier started working with human stem cells over fifteen years ago, the penny dropped. Stem cells can develop on a petri dish into whichever type of cell you want. “I saw a picture of a cardiac muscle

cell made from human stem cells and understood straight away that this was right up my street. I saw it as an opportunity to understand heart development better and to study heart disease.”

The discovery that cells from the human body could be turned into stem cells in 2007 turned the world of stem cell research upside down. These ‘induced pluripotent stem cells’ have the same properties as embryonic stem cells which had been used up to then, but then minus the ethical objections. “Many labs which previously used embryonic stem cells switched and many new research groups dedicated themselves to this field.”

Mini-hearts

It’s difficult to say whether complete organs for transplantation will ever be cultivated from stem cells, according to Professor Passier. What is certain is that the mini-hearts which Professor Passier is currently working on are becoming more and more complex. This is mainly because of the rapid development of stem cell research. Various different cells can be found in the heart. Professor Passier sums them up, “You have more fibroblasts, various types of cardiac muscle cells, the veins in your heart consist of endothelial cells, smooth muscle cells and pericytes and then, of course, you have various types of nerve cells ... Today, we are able to create most types of heart cell, although the efficiency varies greatly. The trick, now, is to isolate each of the various cell types to create a dish of pacemaker cells, atrial cells or ventricular cells, for example. This will create isolated tissue masses consisting of a single type of cell that can be used to study diseases that only

affect cells of that type. At the same time, Professor Passier is working on methods to imitate parts of the heart which consist of different cell types. “For instance we are researching the capacity of stem cells to self-organize, by which stem cells, on the basis of the environment you create them in, grow into a combination of functional cell types with an architecture which is similar to that of the heart.”

Mentality

“We are gearing ourselves to the moment we can apply our knowledge, but at the same time we are continually expanding our fundamental knowledge. Right from the beginning of my career, I was concerned with matters such as: Which genes and which factors are important to the development of the heart and how do you actually make a heart cell? Basically, you need to understand the details of these cells’ development, structure and function. In this way you can better understand what happens when things go wrong, as in the case of cardiac disease. As soon as you try to optimize technology, you run into other fundamental questions. So fundamental research and research into its application are constantly feeding one other.”

In addition to his position at the University of Twente, Professor Passier still works at the Leiden University Medical Center one day a week so that he can stimulate cooperation between the two research institutes. At present, Professor Passier is still ‘discovering’ the University of Twente. “I regularly run into relevant technologies for organs-on-a-chip. The picture in my mind is becoming more and more complete. The mentality at the University of Twente appeals to me very much: it’s a mentality to get things solved.”



Support this research
with a donation:
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MENNO VELDHORST'S FASCINATION FOR THE QUANTUM COMPUTER



Studying things that nobody else has ever seen before, that is what Menno Veldhorst wanted to do when he began studying applied physics at the University of Twente. He graduated in superconductivity and discovered the fascinating phenomenon of the quantum computer. After he completed his PhD he did stint in Sydney. He now works at the forefront of quantum technology in Delft. "I still have direct contact with professors at the University of Twente." BY Hans van Eerden PHOTOGRAPHY Kees Bennema

"IT'S AT TWENTE THAT I

It's a dream come true, says Menno Veldhorst about his recent appointment as tenure-track team leader at the world renowned QuTech institute. At this institute, research groups from the Delft University of Technology work together with TNO and big boys like Microsoft and chip manufacturer Intel on the development of quantum computers and other quantum technology.

Quantum computer

An ordinary computer works with separate binary bits which have two possible values: 0 or 1. A quantum bit can have both values at the same time: 0 and 1. This is called superposition. The second essential property of a quantum computer is entanglement. The values of

entangled quantum bits are connected to each other in all combinations possible. If one bit is added to the entanglement, the number of possibilities doubles. To make a long story short: in theory the computation speed increases exponentially with the number of bits and therefore gigantic calculations can be carried out using a quantum computer.

Fundamental phenomena

In practice, it is quite difficult to make a couple of quantum bits. Menno Veldhorst has been working in this area since his graduation project at the University of Twente. He chose Twente because of its small-scale campus environment where you could live, study and do

sports at one location. "And because of the easy access to tutors. It's easy to approach a professor with questions on matters which go further than the curriculum taught in tutorials." Professor Veldhorst started his degree in 2003. His graduation project was on superconductivity: the lack of electrical resistance at very low temperatures. "What attracted me were the fundamental phenomena such as quantum effects which take place in these conditions."

Knowledge and creativity

In spite of offers from other universities, Professor Veldhorst saw sufficient challenges to keep him in the city of Enschede for another four years to do his PhD research.



“I still have direct contact in Delft with professors at the University of Twente”

LEARNT THE PHYSICS”

Into the Majorana particle for instance, which may emerge when the right combination of materials come under superconductive conditions. And which could be a key ingredient of a quantum computer. “My research was a combination of solving many problems in the production and very accurate measurement at low temperatures. And then when we did see something happen in the measurements, it was difficult to say exactly what, because that was difficult to predict beforehand with the unfamiliar materials we were using. This demanded a lot of knowledge and creativity.”

Breakthrough

Design is always interesting, but after gaining his cum laude PhD in

2012, and winning the Overijssel PhD award, Professor Veldhorst chose a different route. His Twente connections brought him into contact with an Australian engineering team at the University of New South Wales in Sydney. It’s here that he wanted to take the next step as a postdoc towards developing a quantum computer by working with a very familiar material, silicon, the raw material for ordinary computer chips. “I made a pair of quantum bits from silicon and connected them together.” The journal *Physics World* called it one of the ten greatest breakthroughs in physics in 2015. “By using silicon from standard technology, scaling up to build a quantum computer is within our sights.”

Industrial application

Sydney provided an ideal combination of hard work and relaxation on beautiful beaches, but for Professor Veldhorst joining QuTech in Delft this spring was a logical step. “It’s at Twente that I learnt the physics, in Australia I improved my skills in experimentation and now I want to take the step towards industrial application. I will continue to work with the Australian research group and still have direct contact with the professors at the University of Twente. The work we do on quantum technology in Delft is not done on our own; we also make use of expertise from Twente.” Entanglement is still essential.

CAST



The kitchen and the living room of the CAST student house are more like a cavern: low ceiling, dark colours, half-drawn curtains, the smell of smoke. Nevertheless, there is plenty of luxury to be found in the house at Boddenkampsingel 69, which is home to six men who last year won the title of the most entrepreneurial student house in

Enschede. BY Lidewey van Noord PHOTOGRAPHY Arjan Reef

PLENTY OF LUXURY TO BE FOUND IN THE HOUSE AT BODDENKAMPSINGEL 69

When you ring the doorbell at CAST, chances are that Okke Dorrestijn will open the door. He has been living here since December 2015 and is the "house youngest". Answering the doorbell properly is one of his jobs. The youngest resident's nickname is always 'bietmans' (beet-head). House elder Frank van der Gulik explains why, "The youngest member of the first group to live at CAST always got a red face when he drank too much, so he got the nickname 'bietmans'. The name has stuck." "It's not exactly like being a freshman. The youngest of the house does get a couple of jobs to do, but we don't make his life hell." Okke agrees. "I have to put the rubbish out, make sure there are clean tea towels, take out the glass bottles, return the deposit bottles to the shop and open the front door. When the telephone rings, I answer by saying, 'Hallo, this is the beet of CAST house'. But that's about it." And the youngest in the house occupies the smallest room, the beet hole next to the living room.

Decadent

The CAST house, which takes its name from the film industry, is typically decadent, according to Frank. "We always eat well and extravagantly. Money is no object when it comes to dinner. We live the good life. On Friday afternoon we like to sit outside on the balcony on folding chairs with specialty beers in the sunshine." CAST has a jacuzzi in the garden, a projector with a large roll-up screen in the living room and usually there is a car parked outside. Ruben Overmars tells me, "Unfortunately our car has just died. We're looking for a new one," Frank adds, "Very annoying, especially with this weather. Now we have to walk through the rain to do the shopping," he laughs, "I'm not used to that."

"We supply men's tuxedos"

The reason the residents of CAST can live such a decadent lifestyle has to do with their business in tuxedos. Ruben continues, "We are a sales point for GENTS from Delft (specialist in men's formal clothing, ed.). We have been doing it for years. We attend all the fitting days at student societies that are organizing black-

tie events to help men pick out a penguin suit. We take a percentage of the proceeds, and that means we can have nice things, like the jacuzzi, projector and cars." Former resident Diederik van Thiel (1994-2000) explains that the decadent lifestyle at CAST is nothing new. "In our time, we also had luxury. We had a Canal+ subscription, a game computer and two telephone lines, and we regularly went out to eat together."

Old boys

Since 2007, the CAST house has been run by a foundation of former and current residents. All former residents have a door key, "because it is their house too," says Diederik, "It's funny how you still feel like you're walking into your own house even after sixteen years. It feels familiar and the atmosphere in the house is still the same." Every year, there is a Christmas dinner for former and current residents of the house and there is an old boys' weekend. Vincent van Diemen, who currently lives in the house, says, "Then the former residents come back to feel what it is like to be a student again. That means drinking a lot and making wax fires of course: we heat a pan of wax in the garden and throw a cup of water on it, then we watch the fireball it produces – sometimes a tree catches fire too." Frank says, "Old boys who haven't smoked for years, suddenly go through a whole pack or they fall asleep pissed as a fart in the beet hole." Vincent concludes, "But then they come into the living room wide awake again at seven o'clock."

Entrepreneurship

The boys tell how they won the prize last year for being the most entrepreneurial student house in Enschede. This competition is organized annually by Kennispark Twente. In the second edition in 2015, CAST beat seven other houses in three rounds. The boys managed to win a beer tasting round and guess the ingredients of three student meals which had been through the blender. It won them the first prize: a fridge worth a thousand euros. Ruben says, "We didn't take part in the first year on purpose, as the first prize was a jacuzzi and yeah, we already had one of those of course."



Want to add a profile of your student house (current or former) on facebook.com/AlumniUT? Get in touch via alumni@utwente.nl

WORKING ON THE NEW GENERATION OF CHIPS

Uğur Bağcı (28) was planning to get a job in the United States at first. After his Master's in Twente, however, he decided to stay in the Netherlands after all. As an employee at ASML in Veldhoven, he is working on the new generation of chips. BY Marco Krijnsen PHOTOGRAPHY Gijs van Ouwerkerk

"The Netherlands is a melting pot of different nationalities, so I found it easy to integrate"

Uğur studied electrical engineering at the renowned Sabanci University in Istanbul. He wanted to go abroad for his Master's and chose the University of Twente, because the Master's in Electrical Engineering has a great international reputation. "Twente belongs to the European top, especially in my field: micro-electronics and microsystems", says the Turkish alumnus.

The Netherlands was meant to be a temporary stop on his way to the United States. But things went differently. He liked Twente and the same goes for his four-month traineeship at Eindhoven chip manufacturer NXP. One thing led to another, and in 2012 he took a job as technical designer at chip manufacturer ASML.

Melting pot

"The culture in the Netherlands suits me well. I noticed while I was still at UT that people here are very open and that the country is a melting pot of different nationalities, so I found it easy to integrate," says Uğur. "Things are different on the shop floor here, too, certainly compared to Asia or America. Here you work towards a common goal. You are not rivals. The professional culture here is one in which everyone helps one another to improve."

ASML develops machines for the semiconductor industry, in particular machines for producing chips. The systems are used for the trickiest part of chip production: etching patterns on silicon. ASML is the world's leading company in this field, with major customers like Intel and Samsung. "The ambition at ASML is to grow into a ten-billion-euro company. I appreciate that kind of ambition."

Breakthrough

As a technical designer, Uğur is mainly concerned with designing and testing concepts for low and medium power amplifiers. Eventually these developments will help manufacturers to produce chips that are better and faster than ever before. "The demands on electrical devices are increasing all the time. Screens need to have a higher resolution and processors need to work faster, while at the same time devices need to use less energy. Big steps have been taken in recent years, but we still have a long way to go. Thanks to the use of extreme UV light, ASML has been able to develop machines that can produce chips with much smaller structures. This is an major breakthrough, and I'm really proud to be part of it."

AGENDA

14-23 August
CuriousU: Summerschool
of the University of Twente

5 September
Opening of the Academic Year

26 September
MESA+ meeting 2016

30 September
Twente Science Night

21-25 November
Week of Inspiration

25 November
DIES Natalis

Further information:
www.utwente.nl/evenementen

UNIVERSITEIT TWENTE is a modern, enterprising research university. We work to develop the technologies that will define the future of ICT, biotechnology and nanotechnology. We are already acknowledged as world leaders in several areas. We approach new technology in the context of its relevance to society, applying insights from the social sciences and management disciplines. The combination of 'high-tech' and 'human touch' is extremely important to us. We are known for a design-led approach that addresses the needs of the private sector, and for the creation of new, innovative companies. We work on groundbreaking solutions to the major societal issues of the day, such as energy scarcity, sustainability, safety and security, and health. The University of Twente has over 3,000 staff, more than 9,600 students, a network of 40,000 alumni and some 900 spin-off companies.

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SPIN-OFF

SLICK SOFTWARE

BY Hans van Eerden PHOTOGRAPHY Kees Bennema

"We are meeting with Audi and next week we will be visiting BMW." The diaries of Jan Harmen Wiebenga and his partner Johan Hol are filling up with appointments after the launch of TriboForm: software simulating friction, lubrication and wear in production processes.

Sheet metal presses give the doors, bonnets and side panels of today's cars their round forms and sharp lines. This is usually done using steel, but the use of light aluminium is on the rise. The formation process revolves around the interaction between sheet metal, lubricant and machine, and the mould. Use too little lubricant and the sheet metal fractures, use too much and it wrinkles. TriboForm calculates this complex interaction by carrying out a realistic computer simulation of the process. "This prevents at least six months of trial & error and saves manufacturers a lot of time, money and quality-related problems."

Mr Wiebenga and Mr Hol studied mechanical engineering and gained their PhDs at the University of Twente. At the end of 2013, they founded TriboForm Engineering, with support from Kennispark Twente's TOP scheme. An STW valorization grant helped them get the software ready for the market. Now it is time to introduce it to the European automotive industry. "There are already Mercedes, Volvos and Skodas driving round with TriboForm inside."

For more information, go to:
www.triboform.com

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"Our software saves car manufacturers a lot of time, money and quality-related problems"