

UNIVERSITY OF TWENTE.



THE CONNECTION BETWEEN RUBBER AND ASPHALT
BAN ARTHROSIS FROM THE WORLD
STUDENT HOUSE IN THE LAP OF LUXURY

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THE CONNECTION BETWEEN RUBBER AND ASPHALT



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INNOVATIVE SUBURB

Looking at the demographic forecasts for the upcoming years, the trend is clear to see: 'it' is increasingly 'happening' in metropolises. This can best be seen in Africa and Asia, but closer to home, strong urban concentrations (the Randstad conurbation and the Rhein-Ruhr area, for example) also exist. There is something contradictory about this trend: while computer technology enables us to be increasingly independent of space and time and you would expect people to leave the city for the countryside, the opposite turns out to be the case.

By 2020, large areas of the Netherlands outside of the Randstad will have to deal with a sharp decrease in the number of young people. We cannot ignore this trend that is also prevalent in Twente. The UT has a responsibility in this respect. High-quality higher education and knowledge-intensive activities are not the only ingredients for success. Internationalization was the central theme of our 53rd

Dies Natalis celebrations for a reason: after all, we are part of an international arena which is utterly competitive and will only become increasingly more so.

At the same time, we really have to get a move on with social innovation: we need to mobilize young people at the lower end of the labour market as well if we want to put Twente on a higher plane.

What's more: the Netherlands is too small for a distinction between the Randstad conurbation and regions such as Twente. Our country's total area may equal that of a metropolis like Tokyo, but our commute times aren't at the same level. In Tokyo as well, having to travel for more than two hours is simply considered too long a commute. Connecting Twente to the Randstad conurbation by way of high-speed rail therefore is one of the best possible investments. It would allow Twente to become a green and innovative suburb of Greater Amsterdam. ●

"THE NETHERLANDS IS TOO SMALL FOR A DISTINCTION BETWEEN THE RANDSTAD CONURBATION AND REGIONS SUCH AS TWENTE"

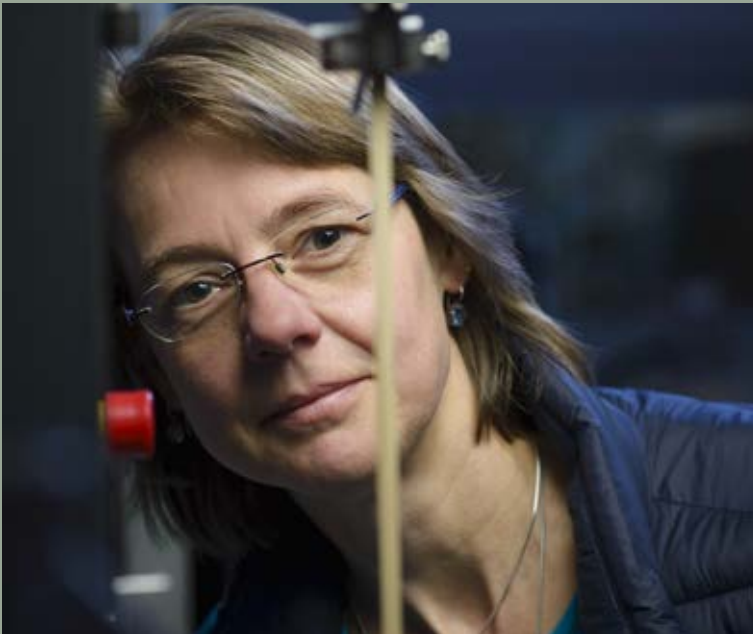


PROF. H. (ED) BRINKSMA, PHD
(1957) HAS SERVED AS RECTOR MAGNIFICUS OF THE UNIVERSITY OF TWENTE SINCE 2009.

THE CONNECTION BETWEEN RUBBER AND ASPHALT

Though computer simulations are useful, the search for better tyre materials still principally consists of a systematic process of testing according to researcher Wilma Dierkes (left). PhD candidate Nadia Vleugels conducts experiments with rubber reinforced with aramid fibres - the same fibres used in bullet-proof vests. Nadia Vleugels: "I try out all sorts of rubber-to-fibre ratios, for instance. My research is to lead to more durable materials that would be highly suited for tyre treads, as those fibres would also further decrease the rolling resistance."





Car tyres are of a quite complex build. The choice of the right tyre materials heavily impacts the safety, economy and noise production of a car. The Tire Road Consortium, a cooperative venture by the UT and partners from the car industry, is conducting research on the interaction between tyre and road surface. There still is a lot of room for improvement. BY Christian Jongeneel PHOTOS Kees Bennema. BY Christian Jongeneel PHOTOS Kees Bennema

Car tyres are made out of a compound of rubber, granting flexibility, and a reinforcing fabric. Traditionally, carbon black was used as this reinforcing component - hence the colour of the tyres. Nowadays, the use of silica (a very fine glass powder) is prevalent, as it drastically reduces the tyre's rolling resistance, in turn making the car more fuel efficient. At the same time, silica does not increase the hardness of the tyre, meaning the breaking distance stays the same or is even reduced somewhat. The precise composition of the rubber and the reinforcement and their ratio are crucial to the tyre's performance. "When the rubber deforms too strongly when driving, for instance because it does not adhere to the reinforcement properly on the nanolevel, the tyre

fails on many levels", Wilma Dierkes, PhD, explains. Following a career in the rubber industry, Dr Dierkes became part of the UT's Elastomer Technology & Engineering research group. "It then negatively impacts fuel economy, safety and durability."

The research group investigates various ways of improving tyre performance. One possibility looked into is improving the agents coupling the rubber and the silica. These agents consist of silanes, organic molecules in which silicone atoms take centre stage instead of carbon. The main questions are which silane, at what ratio, provides the best coupling agent and how best to enable the interaction with the reinforcing component. It is as yet impossible

to accurately predict the characteristics of a tyre made of materials with their own specific characteristics. Or at least this holds true for the top layer, the tread, that comes into contact with the road surface. Improving such predictability is the subject of a research project conducted by the UT in cooperation with tyre

"The research has to lead to more durable materials"

manufacturer Apollo Vredestein, also established in Enschede, and with ERT, a rubber testing company based in Deventer and presided over by a former UT PhD candidate. Epe-based VMI, global

VIBRATIONS ON THE ROAD

The tyre is subjected to a lot of vibrations where it touches the road surface. All kinds of factors play a part in this: the rotational speed of the wheel, the elasticity of the road surface, the tyre profile, the weather (wind speed, rain, temperature). These vibrations are between 1,000 and 2,000 Hertz - exactly the range to which the human ear is most sensible. Just as is the case for the rubber composition, the interplay between all relevant elements is so complex that it is next to impossible to predict the noise generated by a tyre. Yet there is a great need for predictability, as it is extremely costly to conduct practical tests when you're dealing with, say, ten potential profiles and ten types of asphalt. One of the Tire Road

Consortium projects therefore focuses on creating a computer model to better predict a tyre's noise production. This entails constructing a three-dimensional model of the tyre, based on the characteristics of the materials used. So as not to make the simulation overly complex, the tyre is then virtually rolled over a standardized surface. Even then, the vibrations are so complex they cannot be properly calculated. The model has to make use of long-term averages. The calculations are next compared to the results obtained through practical tests. This turns out to work well. Noise production is only one of the less well understood aspects of the interplay between tyre and road surface. Tyre traction is at least equally important. We all know it is reduced



provider of rubber tyre manufacturing machines, has partnered up with the UT for another project.

The goal is to develop reliable measuring equipment to study traction on dry road surfaces without needing to actually manufacture tyres and get them on the road (also refer to the text box).

Trucks

Truck tyres are a completely different matter. They are still predominantly made out of natural rubber, as this is by far the strongest rubber and also builds up less heat when used intensively. Heat softens up the tyre, making it more prone to wear and increasing rolling resistance. However, natural rubber does not couple well with silica, meaning no use can be made of the advantages of silica. This is because natural rubber contains proteins that more easily couple to

silica than its polymers do. "We conduct our research on this topic in collaboration with the Prince of Songkla University in Thailand, as Thailand is the world's largest producer of natural rubber," Dierkes explains. "Apollo Vredestein and the Dutch Natural Rubber Foundation, a remnant from the time the Netherlands were amongst the largest rubber producers due to its colonies, provide the funding."

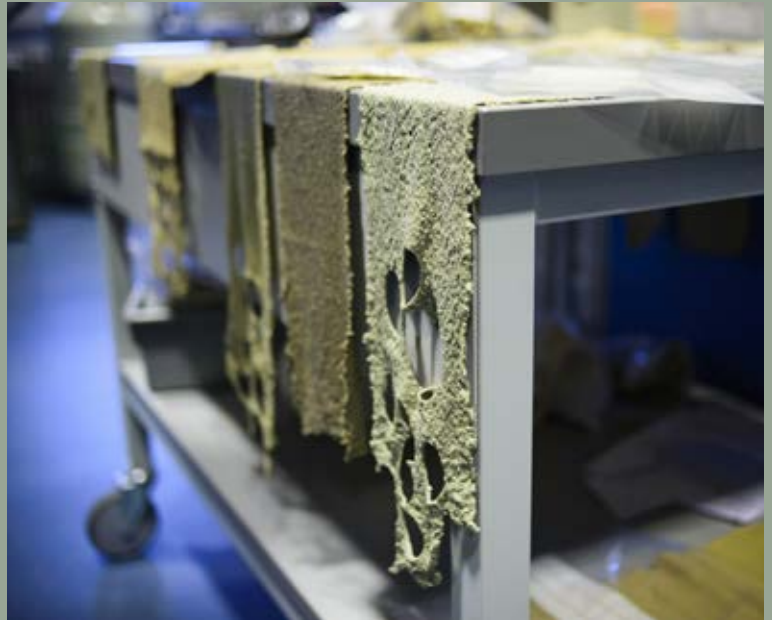
The international element in our research is large: world-wide, there are but a few research groups with the same level of expertise and the same facilities. In addition to India-based Apollo, that acquired Vredestein in 2009 and concentrates its research on passenger car tyres in the Netherlands, tyre manufacturers from places like Japan (Yokohama) and Italy (Pirelli) cooperate with the UT.

World-wide, a lot of effort is going into the research of tyres. This is not surprising, as improved materials or designs can make cars a couple of percentage points more fuel efficient. Given the scale of global car traffic, this means billions in savings and a massive reduction of global CO² emissions.

"The international element in our research is large"

in conditions of rain and glazed ice. By how much exactly? While noise can be measured with just a microphone, we do not even properly know yet how to exactly measure traction. To overcome the problem, an instrument van was developed that is able to constantly measure the roughness and temperature of an asphalt layer during the testing of various tyres.

Slowly, we start to gain a better picture of what exactly happens on those few square centimetres where tyre and road surface meet. Very slowly.



Recycling

Tyres at the end of their life cycle form a problematic type of waste that is difficult to process. While it is possible to shred them and turn the shreds into tiles for children's playgrounds and suchlike, this is not a very efficient solution. Nor is there a large market for this product.

The blending of ground-up tyres with asphalt to reduce road noise could form a larger market.

Experiments with rubberized asphalt currently make use of new rubber, as recycled rubber seems to be unsuited. However, a newly started project on this form of recycling shows that the possibility is there.

Yet, this, too, is not the most efficient way of recycling rubber.

The alternative is to devulcanize the rubber. That is, to break the sulphur bridges that cure the liquid rubber into a more solid state, so as to re-shape the rubber. Ten years ago, the University of Twente pioneered this process - which has since then been commercialized - to recycle excess rubber used for roof coatings.

However, the synthetic rubbers that make up car tyres are much more difficult to devulcanize. Controlling the process conditions in particular is tricky. And should this option

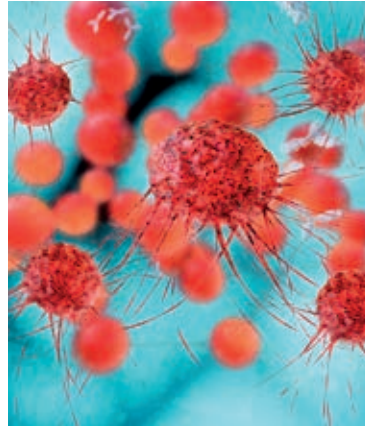
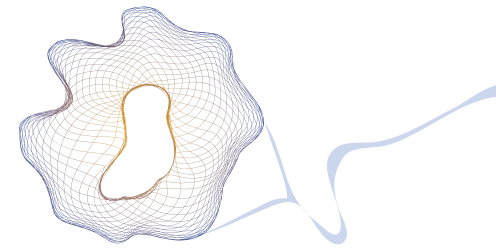
prove to be out, perhaps flash liquefaction, a process developed to turn wood waste into liquid fuel, can be made to be used on rubber as well, so as to recover the reinforcing agents - silica and carbon black. The oil that would result from the process can only be used as fuel, but it still beats dumping the tyres.

One corner of the rubber lab is home to a machine used to

measure the wear of rubber, formed by a cylinder covered with sandpaper that scrapes along a rubber sample. It is currently the best method available to measure wear without actually having to drive the tyres over various types of road surface. Dierkes has no doubt there is room for improvement here. But then, there are plenty of issues already keeping the researchers off the street.



IN BRIEF



SENTINEL LYMPH NODE

In order to determine whether a patient suffering from cancer has metastases, doctors will start looking for the sentinel lymph node, the first lymph node after the tumour. Cells breaking free from the tumour first appear in this node. Researchers of the UT's MIRA research institute have developed a new method for finding the sentinel lymph node. In his doctoral research, Martijn Visscher demonstrated that you can find the node using magnetic nanoparticles, a simple set-up and a clever way of measuring. This patented find prevents having to unnecessarily expose patients to radiation.



LEAKAGE

The transistor, the very basic element of modern electronics, suffers from significant current leakage. In recognition of this problem, UT researchers and the SolMates company jointly developed a prototype of a new type of transistor able to reduce microchip energy use. The trick lies in a piezoelectric material which is applied to the exterior of the transistor. This material expands when you apply a voltage to it and compresses the silicon in the transistor with a pressure of about 10,000 atmospheres. This allows electrons to flow through the transistor more quickly. You can therefore make microchips more efficient by 'intelligently squeezing the transistor'.



DISASTER RELIEF ROBOTS

The odds of someone buried under an avalanche surviving if not dug up within ten minutes are slight. This is why researchers of the University of Twente's CTIT research institute have joined a consortium to develop robots to be used for saving human lives in the Alps should disaster strike. The emphasis within this so-called SHERPA project is on cooperation between human rescue workers, the ground robot with a robotic arm and various flying robots.

CTIT is 1 of Europe's largest academic IT research institutes; MESA+ is 1 of the world's largest nanotechnology research institutes.

TUBERCULOSIS

Biomedical technician Kristian Göeken was awarded the Simon Stevin Student Prize during the STW annual conference. This Prize, awarded to talented PhD candidates, went to him in recognition of his work on a portable device to diagnose a patient with tuberculosis. The device hereto deploys nanoparticles that shift colour in reaction to coming into contact with the genetic material of tuberculosis bacteria. This allows the device to quickly give a decisive answer about whether or not the patient is infected. This audience award includes a financial reward of 1,000 euros.



The University of Twente and Kennispark Twente are annually responsible for the establishment of more than **50** innovative companies, making them into the largest Deloitte Fast Technology **50** supplier in the Benelux countries.



© Jerome Wassenaar

SOLAR CAR

Nineteen University of Twente and Saxion students are presently labouring at developing and building a new solar car. Their goal is to win first place in the World Solar Challenge 2015, a 3,000-kilometre race for solar-powered cars straight through the desolate Australian outback. This year's team is larger than last year's. And there are more firsts: for the very first time, Solar Team Twente is headed by a woman, while the technical team is also strengthened by its first female member. At the same time, ROC Twente participates in Solar Team Twente for the first time. The Twente team will hear the starting shot fired for the sixth time on 18 October 2015. During their last race, the team managed to capture third place, their highest spot till now.



TWO AWARDS FOR NAUTA

Bram Nauta was named Simon Stevin Master 2014 by the STW Technology Foundation. Nauta, University of Twente professor of Integrated Circuit Design, was on 2 October presented with the Prize, which is considered to be the most prestigious award for technical scientific research in the Netherlands. The Prize is awarded to a researcher linking excellent

scientific research to socially relevant issues. Nauta will use the prize money of 500,000 euros to conduct research on unconventional means to improve wireless communication. The Prize was not the only honour received by Nauta in 2014. During the Dies Natalis celebrations on 28 November, Nauta was appointed as University Professor at the UT.

A woman with long, dark, curly hair and glasses is sitting on a concrete ledge outdoors. She is wearing a white long-sleeved shirt under a black vest, black tights, and black boots. She is smiling and looking towards the camera. Her hands are clasped in her lap. The background is a blurred city street with buildings and trees.

“Natural disasters change
your world view”

DANGER IS PART

While pursuing her master’s studies, Efthymia Pavlidou became fascinated by earthquakes. So much so, in fact, that she decided to make them the subject of her PhD research. “Earthquakes are life-and-death situations, yet still we know very little about them.” BY Lidewey van Noord PHOTOS Gijs van Ouwkerk

Pavlidou, originally from Greece, came to the Netherlands in 2011 to follow the Geo-information Science and Earth Observation for Natural Hazards and Disaster Risk Management master's programme at the UT's ITC Faculty. For her master's thesis, she investigated earthquakes, which became the basis for her PhD research. Pavlidou: "When you learn about earthquakes at school, it all seems so simple: they result from the movements of tectonic plates. Yet when you delve deeper into the matter, you will find that there are tons of factors playing their part in the occurrence of an earthquake. Factors that are all interconnected in a very complex system. If earthquakes were as simple as we often make them out to be, we would have long been able to accurately predict them."

Temperature Sensors

In the period right before an earthquake occurs, geological

"I investigate shallow, high-magnitude earthquakes occurring in sparsely vegetated areas suffering from few meteorological disturbances. When the earth gives us a signal, we should be able to see it there."

In conducting her research, she makes use of remote sensing, a technology that involves having satellites making pictures of the ground from space. Pavlidou: "The images were made using temperature sensors. The satellites I make use of are normally used as weather satellites, so this is a new application for them. The images are currently at a resolution of about nine square kilometres, so they cover very large areas. Things would be much improved if we could make use of higher-resolution sensors, so as to get more detailed images."

Multidisciplinary

Pavlidou's main reason for conducting her PhD research at the

together with a meteorologist to verify whether disturbances are caused by atmospheric phenomena, but I also need to consult remote sensing specialists."

Credibility

The Dutch disaster management approach, in particular the way the Netherlands deal with the hazard of flooding, is very much to Pavlidou's liking. "It is a proactive approach. People are aware of the dangers here. They really delve into the underlying mechanism: they take the problem seriously and want to know how it all works, so as to be able to take proper precautions and plan ahead."

Being able to predict the occurrence of earthquakes would be of enormous importance, but science has not yet advanced to the point where that is possible. Pavlidou: "As a scientist, you cannot take any risks in this regard. If I were to announce there will be a San Andreas Fault rupture and call for the evacuation of San Francisco, but nothing would in fact happen, I would lose all my credibility. We need to be patient, however hard that may sometimes be."

Growing up in Greece, Pavlidou often experienced earthquakes. Luckily, she was spared the big ones, but she did experience a lot of smaller quakes. Pavlidou: "One could ask why people would decide to live in an earthquake-prone area. But then again, you have to live somewhere. Danger is omnipresent. It is part of life. The fascinating thing about natural disasters is that they change your world view. One moment, you're completely focused on the daily grind, that fight you had, or what time you need to head to the store, and the next, the utterly unexpected happens. You're forced to look at life in a different way."

OF LIFE

processes take place that could be considered its precursors. Research has found that the ground heats up prior to an earthquake, due to increasing pressure on the earth's surface. Pavlidou's research further explores this possibility. Pavlidou: "At this early stage my focus is on developing a method to exclude other possible causes for this heating phenomenon, like the weather, seasonal cycles or forest fires." Pavlidou researches areas in Iran and Turkey with regular seismic activity.

University of Twente is that the ITC Faculty is the world's foremost remote sensing institute. "This is one of the very few places on this earth, or perhaps even the only one, where I can conduct my present research. What's more, the working environment here is incredibly inspiring. I work in a multidisciplinary team, which means that our brainstorm sessions are educational to all of us. Exactly because of all the various disciplines and views represented. While working on this seismological project, for instance, I need to work

WHY GENEROUS DONORS GIVE



To some students, being able to pursue their studies or live a carefree student life is not a matter of course. Simply because they lack the financial means to pay for their studies. Scholarships are of great importance to grant these students a chance of developing themselves.

BY Lidewey van Noord PHOTOS Gijs van Ouwerkerk

Students can already apply for a number of scholarships. Such scholarships are often provided by companies that wish to boost the development of talent. The

funds to provide students with a chance. Examples include the scholarship for nanotechnology students provided by Ferdinand Fransen, the Gerard Sanderink Scholarship for local Twente talent, and the Kees van der Graaf Scholarships for ATLAS students. Foreign students lacking the resources to come pursue their studies at the UT may apply for the Professor De Winter Scholarship, derived from the estate of Mr and Mrs De Winter.

receiving a Gerard Sanderink Scholarship. This scholarship is awarded to technical students with financial needs. Brandwacht: "Receiving this scholarship means I do not have to work as much to pay for my education. I quit my side job and now have all the time to fully focus on my studies. I also enrolled in an English course, to improve my English-language skills."

international electronics company Thales Group, for instance, in 2014 awarded ten scholarships to ambitious female technical students in the last stage of their studies. But private persons, too, often donate

Belinda Brandwacht (Biomedical Engineering master) in September 2014 was one of four UT students

Gerjan Hammink (Applied Physics pre-master) is another Gerard Sanderink Scholarship recipient. "It literally changed my life. I graduated from the Applied Physics programme at Saxion College two

"We need scholarships to get talent to come to the Netherlands and to keep that talent in the Netherlands"

MONEY AND WHY WE NEED THEM

years ago and wanted to continue my studies at the UT. Without the scholarship, I would have never been able to afford it. It allows me to start a new chapter in my career and has given me access to a much wider range of work options.”

The Gerard Sanderink Scholarships were first awarded this September. Sanderink owns the investment company Sanderink Investments, putting him in charge of the IT company Centric, Antea Group consultancy and engineering, and the Strukton and Oranjewood construction companies. He made the scholarships available to support students in Twente who are demonstrably capable in the field of technology. The scholarship is awarded yearly and is in principle granted to a student for the duration of their studies.

Sanderink: “Quite a few people grow up in families lacking the financial means to pay for an education, even though these youngsters really want to follow a programme and are very good in their field. By helping them to obtain a degree I invest in the future, and in the future of this region. I am convinced that by providing scholarships, you are able to raise the level of the entire society. I also believe in reciprocity: I aid people in need of support, because I would like to receive such support if I were to need it.”

Barbara Fransen is daughter of Ferdinand Fransen and director of Agfra Holding in Enschede. The Fransen family has made a scholarship available five times now. Fransen: “My father was general director of Arke Reizen. He built up that company from scratch with the support of staff from

Twente. He therefore wanted to return something to society. And in particular, to this region. The university makes Twente more attractive, which is why we decided to make money available to offer scholarships.”

The Fransen scholarships are specifically awarded to nanotechnology students. “The MESA+ Institute for Nanotechnology is a renowned institute, not just in the Netherlands, but in the entire world. It has really made a name for itself. We believe giving talented students the opportunity to study at the institute is a good investment. Both in the future and in Twente.”

To universities, attracting and retaining major talent from all over the world is key, but sadly, they often lack the financial means to do so. Universities are therefore ever more frequently dependent on scholarship donors. Ed Brinksma, Rector Magnificus of the University of Twente: “As a university, we are able to play an important role, both for our direct region and for the entire country. We need scholarships to get talent to come to the Netherlands and to keep that talent in the Netherlands. The provision of scholarships is an excellent example of corporate social responsibility or charity. What’s more, it’s a desperately needed investment in society.”

Maurice Essers, Manager of the Alumni & Development Office and Director of the University Fund: “Providing scholarships is not only key to giving major talent a chance to prove themselves. As Ed Brinksma already indicated, it is also important to the entrepreneurial Netherlands and the Twente region. The University Fund

is busy acquiring more funding so as to make more scholarships available to students who want to come study at the UT. To achieve this goal, we call on our alumni, our partners and the corporate sector to help us out.”

If you support the University of Twente, then consider contributing to the University Fund!

The University Fund exists for the benefit of the University of Twente and its community of staff and students. We are able to provide financial support to various projects thanks to the generous donations of companies, alumni and other partners. The University Fund is a registered charity in the Netherlands ('ANBI status') whereby donations are tax-deductible subject to the usual thresholds and restrictions.

Alumni and partners: become a donor

If you support the work of the University Fund, please consider making a contribution or becoming a regular donor. Go to: www.utwente.nl/ufonds.

The site also includes further information about fiscal benefits, regular donations and named funds.

Companies: become a 'patron'

We welcome companies as 'patrons' of the University Fund. For a minimum annual donation of €2,500, your company will follow in the footsteps of the founders of the University of Twente. For further information, see www.utwente.nl/ufonds.

If you want to contribute to a scholarship or establish a scholarship, please contact Maurice Essers, tel.: +31 (0)53 489 3993, email: m.l.g.essers@utwente.nl.

 stichting universiteitsfonds twente

In June 2014, Jurnan Schilder (1990) won the Central Education Award. As such, he is the youngest ever UT Teacher of the Year. If you believe good education in this digital age is all about snazzy PowerPoint presentations and all that, you are in need of a reality check: by awarding the prize to Schilder, the students have shown that they prefer thoroughness and the old-fashioned blackboard.

BY Lidewey van Noord PHOTOS Rikkert Harink

YOUNGEST EVER TEACHER OF THE YEAR

Schilder has been working as a teacher at the Applied Mechanics department since 2012. He teaches the third-year course on Structural Dynamics. When still a Mechanical Engineering student, he worked as a student assistant for no less than ten courses. And within weeks of graduating, he again found himself in front of the class. In his Central Education Award acceptance speech, Schilder emphasized his conviction that inspiring teachers with a good story to tell are at the very basis of excellent education.

He added: "As a true scientist, a good story does not mean a nice

story, but a simple, short and sound one. A wise man once said: "The more colourful the jacket, the more sad the clown." Schilder believes the fact that his own student years are still fresh in his memory to be a major boon in structuring his own courses: "I can still easily recall the time I was following this course myself and remember what I did not get. My own experience, which is still fresh, allows me to consider: all right, if I want to do it right, I need to do it like this. Do tell this, don't tell that, explain that a hundred times over. I don't have time for nonsense. Everything I say is important. I believe this to be a

very clear teaching method. One could say I just teach the way I wish my own teachers would have done."

Blackboard

Schilder opted to make sure that the course he teaches includes many contact hours and that the pace of teaching is relatively slow. He always fully expounds on a subject on the blackboard. For, as he said in his speech: "The more PowerPoint slides, the more colourful the jacket." Schilder: "When you are presented with the entirety of a formula on a slide in one go, you need to figure out the



"I just teach the way I wish my own teachers would have done"

mathematics and, at the same time, need to listen to what the teacher tells you. But if you get a step-by-step, visual explanation of how the formula works, the mathematics are easier to digest. I used to love a teacher for writing out the entire formula, so I was adamant I do the same myself."

Roller Coaster Designer

From an early age, it was Schilder's dream to design roller coasters - which explains why he chose to graduate on the topic of the vibrations in roller coaster trains, working for a roller coaster manufacturer. Yet when he was

given the opportunity to live his dream, he chose to go for a doctoral degree. Schilder: "I asked myself: can I give all of myself in my work when designing roller coasters? It's a great job, naturally, but will the excitement still be there a few years on? What I am doing now, combining teaching with in-depth research, taking the time to solve a complex practical problem - it appeals to me.

I want to do more than just be faced with an interesting challenge. I love helping others pursue what it is they want to do in the future." And when things don't work out?

Schilder: "It greatly bothers me. In the end, everyone passes, even if it takes one or two resits, but every now and again students are faced with the strict Bachelor-before-Master rule: they cannot start on their master's programme only because they did not yet pass my course. I cannot help but consider it to be my failure, to an extent. Perhaps I could have explained differently.

Or perhaps I could have done just that bit extra to make sure they would pass. It does gnaw at me."

The love for travelling was ingrained in Marten Susebeek from a young age, so it is no big surprise that he joined his fellows from AEGEE student association on study trips throughout Europe and conducted his final thesis project, on Philips solar energy-powered lamps, in Ghana. A less obvious result of working on this project was that Susebeek, a mechanical engineer and business administrator, would become gripped by a totally different topic: the supply of water.

BY Christian Jongeneel PHOTOS Gijs van Ouwerkerk

PREPAID WATER FOR KENYA

People in Africa are incredibly inventive and entrepreneurial," Susebeek says, "but the supply of water is a real problem. It should be possible to improve matters, I thought. Not by some external project, but by smart monitoring and maintenance by the local community. I had many long nights thinking and working on the issue, also after I returned to the Netherlands. In the end, it kept me from graduating for eighteen months."

Water Booth

He had not just wasted his time, however. After graduating, Susebeek immediately set up his own company, Susteq, manufacturers of a 'prepaid water supply system': an electronic device is installed on the water pump that only allows water to come out after payment has been made. The device also monitors whether the pump is working properly and how much water is tapped. In his system, villagers buy 'water credits' at a special water booth. These credits are stored on a key chain with an RFID reader, which allows them to get the water running. In this way, they themselves pay for the maintenance of the system. The booth's manager is the point of contact for complaints.

Water Station

The Susteq system prevents the far too common issue of an external organization installing a water



station for free, only to have it break down after a while, with no repairs forthcoming, because no-one feels responsible for the maintenance. Water will then need to be brought in from elsewhere - a far more costly affair than Susteq's prepaid water system.

Various UT faculties supported Susebeek whenever possible, especially by providing expertise. The first prototype of his system was built in the 'Working Group on Development Techniques' workshop. A group of students lent their aid in developing a prototype that was tested in Ghana. The feedback was sufficiently positive

to continue the project. Susteq participates in the TOP programme, which offer of support includes housing, an interest-free loan and business consultation.

Susebeek: "Eighteen months ago, we started a pilot in Kenya. This has been such a huge success that we're now going to start up a larger project to supply five to ten thousand people with water. In Ghana, we're setting up a project integrating the prepaid water system with a membrane filter, purifying the water into safe drinking water. Our goal is to serve millions of people on three continents within five years."



More information
www.susteq.nl

INTERNATIONALIZATION

If we were to draft a dictionary of words and terms most frequently used by university directors, 'internationalization' would no doubt be in the top 10. For science and academics go beyond national borders. And scientific institutes wish to make optimum use of this fact.

Yet, for some reason, the word 'internationalization' makes me a bit uncomfortable. Given that it is a matter of course for science to be conducted internationally, it feels a bit off to so consciously strive for 'internationalization' still. It sounds like one of those slogans extolling the virtues of some small town or another: if they really need to point them out, you start to wonder how much of it is true.

I can still remember those long-ago days when the question by international students as to whether the Participants' Council could use English during its meetings, because they would be unable to nominate themselves as candidates otherwise, led to massive protests. The world has radically changed since then. All master's degree programmes at the University of Twente are taught in English. The bachelor's programmes are soon to follow. In my department, close to half the permanent staff has an international background. No printer has a Dutch menu any more. The UT is an international university to its core. And who would have expected differently, from the one true 'campus university' in the Netherlands?

Yet there is some room for further development still. Most universities now offer a 'graduate school', for instance, but fail to present an attractive range of programmes on offer. Nor do they employ an annual inflow and selection moment, as is common in the US. And the possibility of making ends meet by taking a side job as student assistant is completely lacking. Then there's that near incomprehensible Dutch division of institutes in universities and schools for higher professional education. Why not opt to implement 'undergraduate schools' for combined university and professional education bachelor's programmes and 'graduate schools' for the master's / PhD programme combinations? And don't get me started about supervisorship. Here, you need to be a full professor to be a thesis supervisor, while at the same time you're also expected to lead your department. In the US, everyone with a doctoral degree is allowed to serve as a supervisor, while you don't have to be a full professor to head a department.

Internationally, the UT has always been a pioneer. Its campus combines science with student life. It featured a major-minor system while other universities still had to look up the very words. And it had established research institutes in addition to its faculties. I therefore cannot but be convinced that our Executive Board's internationalization drive will only serve to lead the UT into a brighter future. ●



“THE UT IS AN INTERNATIONAL UNIVERSITY TO ITS CORE”



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

UT SPIN-OFF CONVERGENCE BRINGS DESIGN INTO THE LAB

Born of parents who both had established their own companies and opting to pursue his studies at an entrepreneurial university, Felix Broens seems to have been made to become an entrepreneur. True, his entrepreneurial spirit was still dormant during his student years, but after his graduation, membrane technology professor Matthias Wesseling managed to awaken it in 2009. At present, his company, Convergence, is a worldwide supplier of testing systems for fluids and gasses. BY Hans van Eerden PHOTOS Eric Brinkhorst



GOING FROM AN APPLE TO APPLE-LIKE'

Felix Broens' family name has a familiar ring in UT circles. His father, Lute Broens, was co-founder of X-Flow, a successful UT membrane filter research spin-off company. X-Flow is currently part of multinational company Pentair and is established in Enschede.

Apple and Tree

When Felix was unsure about what to start studying upon completing his pre-university education, his father suggested chemical engineering. The apple thus took after the tree, also when it came to picking a specialization, as Felix was interested in membrane technology. His thesis supervisor, Matthias Wesseling, currently employed in Aachen, Germany, was looking for a smart testing device to speed up his group's research. In Felix he detected the skills to turn such a device into a commercial product: a reliable and easy-to-program machine to take the place of the various jury-rigged testing systems used by researchers.

Running Start

This became the sprout from which Convergence was to blossom in 2010, when it was set up at the BTC-Twente incubator centre, right across from the UT campus. Felix Broens applied for the famed UT/Kennispark Twente TOP programme. The interest-free

loan of 20,000 euros he was provided with ("I'm currently paying it off") gave him the financial means for a running start. His father contributed to his son's success by providing a network. "A great stepping stone. But it is then up to you to make something out of it." His mother, who runs an organizational advice agency, became a sparring partner: "Where is my company now, and where do I want to take it?"

Unique Design

Pollution - and the associated production loss - forms the main bottleneck in membrane filtration technology. Convergence developed a handy and flexible testing device for measuring the pollution rate. This allows for fine-tuning an installation such as a water purification plant. The machine can also be used for gas separators and leak testing equipment. In addition, Convergence produces industrial dosing machine and small pilot process installations. Every new use of his technology, in each case governed by new and different demands, requires a unique, client-specific design.

'Apple-like'

The focus on design is a unique characteristic of Convergence. "I attach great importance to ease of use and looks. There are beautifully designed cars, TVs and



smart phones, so why shouldn't we bring design into the lab? Conventional testing devices are usually constructed on the basis of large steel frames and they tend to come with rather rigid operating systems. Convergence engages graphic designers and provides a flexible interface for operating the systems via tablet or pc." Matthias Wesseling is ecstatic: "The products of Convergence meet all the criteria of a typical Apple product: sophistication inside, easy-to-use, intuitive user interface."

Entrepreneurship

Doing business was something Felix Broens learned in practice. "As Convergence is getting bigger, I start to feel more responsible for my staff. That's why I focus exclusively on sales now. We appointed a general director - nominated by my father, by the way - as I adamantly refused to take on that role myself. I'm too creative and chaotic for the job." Convergence now employs 12 members of staff and is established in Euregio Business Park, on the eastern side of Enschede. "Our location isn't really relevant. We export our systems worldwide."

Strong Relations

Broens maintains strong relations with the UT and a number of its departments. "We are proud to be a

spin-off of the membrane technology group. It has supported us by buying our systems and referring possible clients to us." The same applies to Ruurlo-based Bronkhorst High-Tech, which produces pressure and flow measure instruments and is a UT research partner. Many Convergence products are 'Bronkhorst Inside'. "Bronkhorst supplies high-quality instruments and are a local Dutch producer. Something we support."

In all Labs

Thanks to the UT, Convergence has become a well-established company. Running a stable company, going for slow but steady growth: that's how Broens

"We are proud to be a spin-off of the membrane technology group"

describes his ambition. "Quality and good service are key. Each product is different, so problems do occur. But we always manage to solve them. I am not too interested in rapid growth - though it would be great if we were to be represented in every lab in the world."

www.con-vergence.com

INTO THE LAB

What **DesignLab**
Where **The Gallery**

BY **Marco Krijnsen** PHOTOS **Gijs van Duwerkerk**

If you're looking for a workplace in the DesignLab, you've got all the choice in the world: Beanbags, chairs, stools, wooden benches and cushioned sofas. Not every seat meets the health and safety rules, but here, it's allowed. In fact, users - be they students, researchers or business or government partners - are expected not to remain seated for long. Everyone is to go round, encounter new people, work with them and acquire new insights.

The new DesignLab is literally designed to have people from all sorts of disciplines come together and collaborate. Unexpected encounters speed up the innovation process. This multidisciplinary approach is urgently needed to find solutions for the major problems facing society, the DesignLab founders believe. An example: the rise of autonomous cars. Clearly a development that cannot be approached exclusively from the technician's point of view.

Today, the DesignLab works as intended. In the 'brainstorming section', Computer Science, Creative Technology and Business and Information Technology students were first provided with an introduction by Dennis Reidsma, teacher of Human Media Interaction. They formed small groups and are now discussing what interactive platform to design, and for which audience. A few seats on, a small group of students is busy developing an educational game for primary school pupils.

"The great thing about this lab is that it is the home of the entire development process, from idea to prototype," Reidsma tells us. "The way the lab is designed promotes informal meetings between students of various disciplines. You notice someone working on another project. You go over to talk to them. As a designer, this process allows you to start looking at things differently."





“Science 2 Design 4 Society”



More information: Do you face a social question requiring a creative, multidisciplinary approach? If so, contact Miriam Iliohan: m.iliohan@utwente.nl, or visit our website: www.utwente.nl/designlab

“A worldwide quest for speeding up innovation”

INTERNET OF THINGS

NXP Semiconductors has by and large left the ‘normal’ market in processors for smart phones and tablets behind. It has dedicated itself fully to the next big growth market: the ‘internet of things’. UT alumnus Hans Rijns, Senior Vice-President and CTO, is in a hurry: “Here in the Netherlands, we remain stuck in our comfort zone for rather too long.” BY Wiebe van der Veen PHOTOS Kees Bennema

Billions of additional devices connected to the internet, from our smallest household gadgets to our cars. The signs are there already: smart watch technology and health and fitness apps allowing you to constantly monitor your fitness and share this information on the go. In the future as envisioned by NXP, this is just the beginning. The company, which split off from Philips in 2006, is growing rapidly, its 2013 turnover totalling USD 4.8 billion dollars.

Solid

The NXP mission is embedded in its slogan: 'Secure connections for a smarter world'. These are not just pretty words, senior executive Hans Rijns explains: "A spotty connection on our tablet is just a nuisance. But things are different when our cars are connected to the internet and communicate with other cars. In that case, an unstable connection is not just a nuisance. It is a safety risk. Our privacy, too, is at stake: the information in smart energy meters installed in our homes is telling about presence - or absence.

How to protect such information? It is all about developing very solid systems. A world leader in the production of microchips for use in the intersection between the analogue and digital, NXP is in a great position, Rijns believes. The company is active in over 25 countries: "This means we have access to the best talent on a global level. We are also keen on finding out where on this world we can speed up innovation. For instance, an important mobility pilot is currently running in Singapore. We find they manage to get things done very quickly there, as a very sharp sense of urgency exists. This sense at times seems to be lacking here in the Netherlands. We remain stuck in our comfort zone."

Rijns calls on both the Dutch government and the knowledge institutions in the Netherlands to act. The collaboration with NXP is quite good, but Rijns believes there is room for improvement: "Naturally, excellent research and education should be prioritized. But if this means no time is left to talk about a long-term vision with the business sector, we're doing something wrong."

Different World

Even when still pursuing his Electrical Engineering studies at the University of Twente, in the 1980s, Rijns was 'always in a hurry': graduate quickly in the recently introduced two-tier system and quickly obtain a doctoral degree. He also got acquainted early with Philips' R&D management, who had a stake in his research.

"Even then, I was more interested in how my research could be used, in the business side, than in the technology itself. So it was a matter of course that I would start to work for Philips. It was a completely different world, though: instead of working on a new design alone or in a small group, we were with hundreds of people." Starting his career in the Philips Physics Laboratory, the very cradle of GSM technology, Rijns swiftly transferred to Nijmegen-based Philips Semiconductors, working on a new product range. His group of ten people brought in 100 million guilders of turnover. "Back then, we produced everything ourselves, from the microchips to the actual telephones. It was a boom market. We were doing business everywhere. We seriously asked ourselves what the best spot in the world was to be based. The answer: it did not matter."

Making a Difference

Months before it was made public that the Philips semiconductor




sector would split off to form NXP Semiconductors, Rijns was asked to refocus the chip design research programmes at Philips Research. As Vice President Research, he was directly involved in the complex business of demerging the various company activities and decide which activities would remain at Philips and which would be transferred to NXP.

"A complex matter. All the more so because I had only just returned to Research. But I experienced it as a very positive coincidence. These past few years at NXP, too, we had to make a number of clear new choices. Our current technology and product portfolio looks radically different from what I would have expected but a couple of years ago. This also means you have to say goodbye to some technologies you used to be a leader in, but which are not relevant enough to make a difference nowadays."

"I am at my best in a stimulating environment"

Rijns has been NXP CTO since the summer of 2012. He has immense 'secure connections for a smarter world' ambitions. "I am at my best in a stimulating environment. So studying at the University of Twente, being surrounded by people like Hans Wallinga and Ton Mouthaan, was an incredible experience."



“Structurally making agreements about educating talent, doing research and the use of facilities.”

CONNECTOR OF UT AND

MIRIAM LUIZINK: STRATEGIC BUSINESS DEVELOPMENT

The University of Twente is now seeking out the corporate sector more than it ever did before. With innovation vouchers, additional PhD positions, PDEng trainees - and with director Miriam Luizink. BY Marco Krijnsen PHOTOS Eric Brinkhorst

Miriam Luizink is a child of the University of Twente. She studied applied physics at the UT, to return at a later time as technical-commercial director of MESA+ and general director of High Tech Factory. She has served as the Strategic Business Development director since last summer. Her mission: to have the University and knowledge-intensive companies work together more often and with increasing intensity. "We want to structurally make agreements with the corporate sector about educating talent, doing research and the use of facilities."

Innovation vouchers

There is still a world to win, Luizink thinks. "We want to increase the

T-Xchange and our facilities in the field of robotics. In order to lower the barrier the province is providing innovation vouchers. Businesses can put in such a voucher worth a maximum of 10,000 euros to use these research facilities. That could be the start of a more structural collaboration."

Five research themes

In addition, in the short term there will be more PhD positions that will be financed by both the corporate sector and the university. The UT has named five research themes within which the UT, together with the corporate sector, will create 100 PhD positions in the next few years: advanced materials, advanced manufacturing and mechatronics,

create value for the company? That's the assignment."

For many smaller companies a four-year PhD position often lasts too long and the outcome is uncertain. In order to meet them halfway the University is going to use the PDEng more: the Professional Doctorate in Engineering [also see the article on page 35].

This is a multidisciplinary designer who follows a post-master's programme at the UT and will get to work as a trainee with companies. "A great way to work on an actual assignment within the company. Agreements were made with Reggefiber (specialized in fibre optics) for about 10 PDEng trainees



Do you, as a business, want to know more about the possibilities of collaborating with the University of Twente, contact Miriam Luizink: m.luizink@utwente.nl

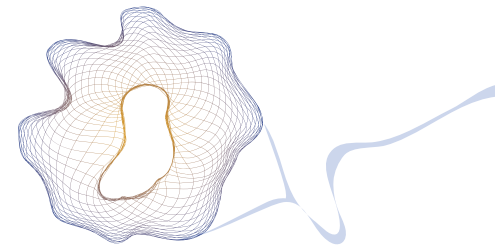
CORPORATE SECTOR

visibility of our expertise centres and laboratories and make them accessible for external parties. Take the European Membrane Institute. This research group of the UT chiefly works for national and international membrane industries, but we think that this knowledge is relevant for more companies. For this University has quite a few facilities with expertise that are as yet sadly unknown to many, such as the DesignLab, the research centre for serious gaming

medical technology and devices, wireless and remote sensing, and safety and security. Luizink: "These five themes transcend the individual institutes and faculties. We would like to collaborate with the corporate sector to develop broader programmes, in which both business and technology are represented, and both education and research. The requirements of the company are key. Where do we see opportunities to, using the knowledge and expertise of the UT,

who will design solutions for preventing construction damage. We are building similar programmes with companies in the Maintenance, Robotics, Process Technology and Healthcare Logistics sectors."

IN SHORT



96% of UT graduates gets a job after obtaining their degree



CARTILAGE

Researchers of MIRA have managed to grow cartilage from stem cells in a laboratory. This cartilage remains cartilage when inserted into the body. Up till now, laboratory grown cartilage turned into bone tissue soon after having been inserted in the body. The trick is to grow the cells at a low oxygen concentration. The fundamental research, which has been published by the leading scientific journal PNAS, brings us one step closer to the treatment of cartilage diseases such as arthritis.

VOLVO OCEAN RACE

The University of Twente is the scientific partner of the Dutch Team Brunel during the Volvo Ocean Race, a sailing competition around the world lasting nine months. This race counts as the most prestigious sailing competition of the world. Students from Twente will analyse large amounts of data during the event, for the purpose of improving the performance of the boat's crew.



AGRICULTURAL PRODUCTION

In the western world, the use of earth observation technology for the purpose of increasing agricultural production is ubiquitous. However, for small-scale farmers in Africa and Asia this technology is currently less suitable. A large research project,

managed by the ITC faculty, should improve information systems so that small-scale agricultural economies in Africa and Asia can profit from the technology. The Bill & Melinda Gates Foundation has made 7.5 million dollars in research subsidy available for the project.



MAGNETOSPERM

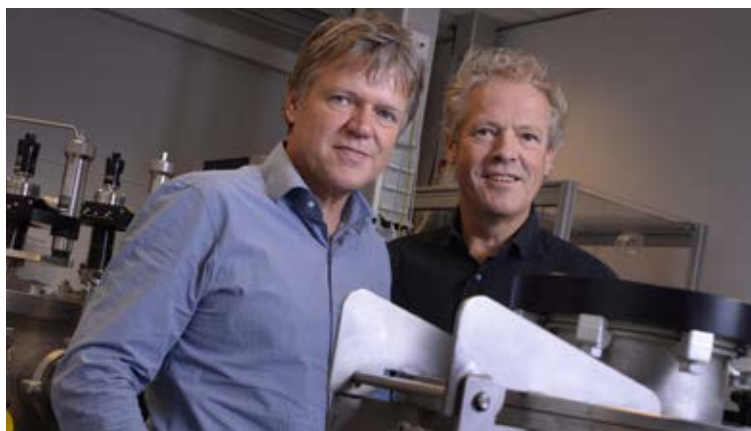
Scientists of MESA+ have developed nanorobots that move in the same way as swimming sperm cells. This 'MagnetoSperm' has a simple design with a head of metal and a flexible body which is about six times larger than a human sperm cell. You can have the robots swim to the desired location with a weak external magnetic field. The MagnetoSperm has, amongst other uses, been developed to be able to more specifically administer medication in the body.

Horizon 2020:
European IT projects
UT is worth 2 million



MOOCs

MOOCs, Massive Open Online Courses, are courses which can be taken by everyone via the internet. Teams of the University of Twente have been busy with developing two MOOCs for several months now. These online courses will become available in 2015. One MOOC has Medical Imaging as its theme, the other is about Smart Cities. The courses will be offered via the Futurelearn platform.



VALORIZATION AWARD

Dave Blank and Guus Rijnders of UT research institute MESA+ are receiving the prestigious FOM Valorization Award 2014. The award consists of a sum of 250,000 euros and is intended for researchers who have managed to successfully turn the results from their own research into something of use for society. The jury describes the researchers as "two excellent bridge builders

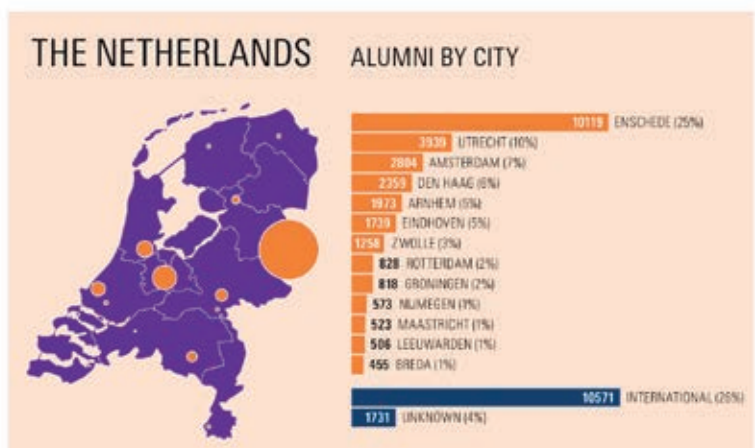
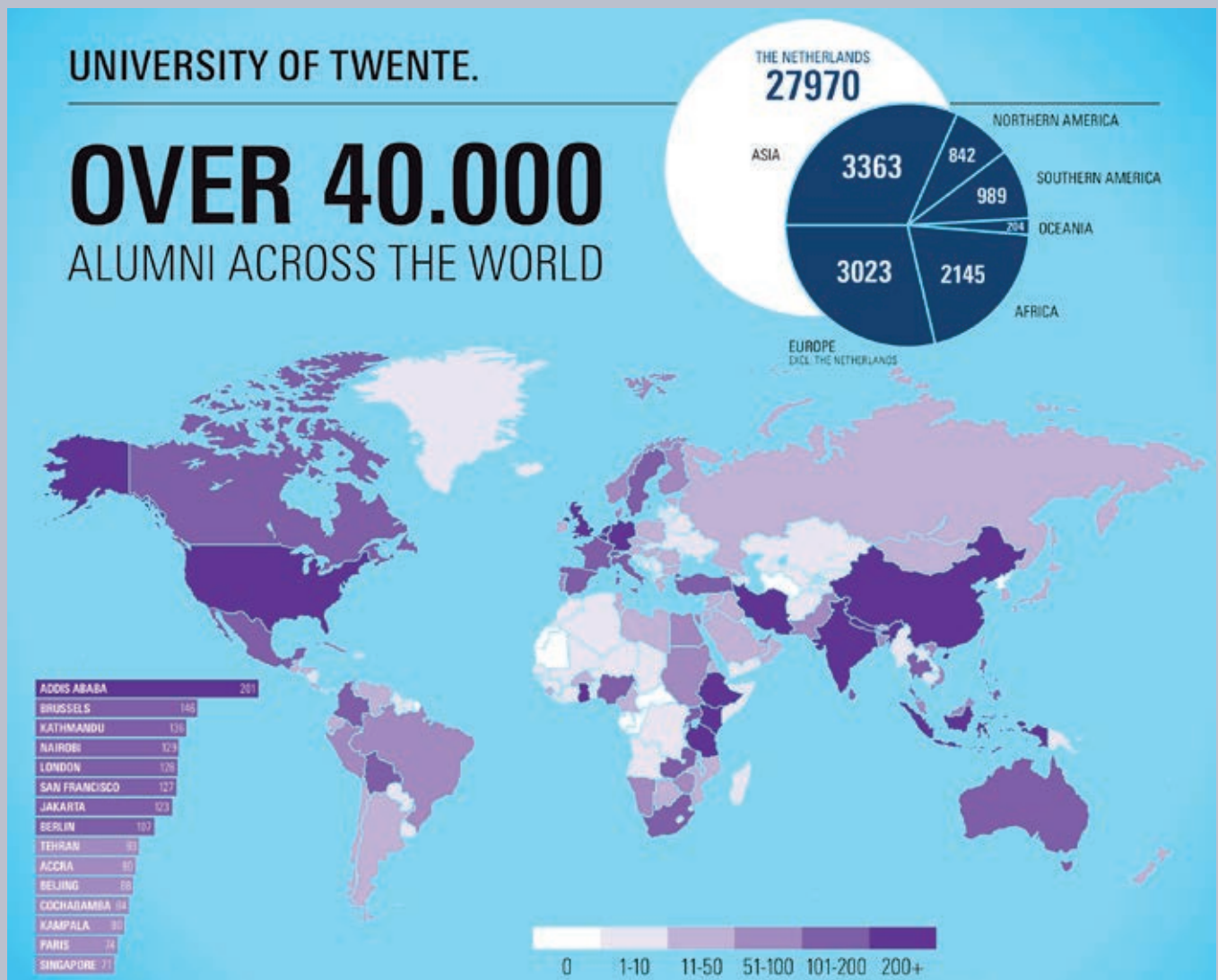
between various fields of science, between science and entrepreneurship, and between science and society. Blank and Rijnders will use the award for the development of new research tools and to create new types of sensors using new materials.

The UT is in the top 100 of technical universities in the 'World University Rankings' of Times Higher Education (THES)

NEW UT ALUMNI NETWORK INFOGRAPHIC: THE INTERNATIONAL REACH OF UTWENTE

26% of the current UT alumni pool is 'international': This infographic is based on the UT alumni database, with the help of LinkedIn the list has been supplemented with UT graduates living outside the Netherlands. ITC alumni with scientific degrees have also been included in this infographic. The 15,000

ITC alumni with completed (non-scientific) courses were not included in the infographic but also represent an important component of the international reach of the University.



5 CITIES USA ALUMNI TOUR

The largest concentration of technical alumni outside the Netherlands is in the USA. Over 3,000 alumni of the University of Twente, the Delft University of Technology or the Eindhoven University of Technology live and work in the USA. For that reason the technical universities have decided to join forces and together visit alumni there with the objective to strengthen the ties and launch alumni chapters.

Following 5 months of preparatory work, the five cities with the largest population of alumni (Boston, New York, Seattle, San Francisco and Houston) were visited by the alumni relation managers. The theme of the tour was 'Engineering new boundaries'. This stands for the enormous range of work fields for which alumni have been educated and in which they are working. At the same time, it stands for exploring alumni relationships on another continent.

In addition to the informational character in the form of one or two lectures all meetings had room for networking and catching up. It became quickly apparent that bringing the alumni of these three universities together was seen as a valuable networking opportunity. Old acquaintances met each other, but it was also the start of many new relationships. One of the highlights of each meeting was signing the specially designed banner in order to put even more emphasis on Dutch Engineering and the connection felt by these participants. In total over 200 alumni were present at these meetings.

UT ALUMNI ON THE MOVE

- As of April 2014 **Fumihiko Shimizu, PhD in Chemistry, 2002**, is the general director of the Mitsubishi Chemical Group Science and Technology Research Center in Japan. Shimizu obtained his doctorate in chemistry at the UT in 2002.
- Starting June 2014 **Ruud Riem-Vis, Electrical Engineering master, 1988**, is CEO and CTO at Kizy Tracking in Neuchâtel. Previously he was the CTO at Jiiva in Bern.
- As of June 2014 **Esther Verburg, Industrial Engineering and Management master, 1998**, is Senior Director Global Corporate Responsibility for Tommy Hilfiger. Verburg has been a senior lecturer Corporate Responsibility at the UT since January 2013. She is also the founder of consulting company New Equilibrium.
- In July 2014 **Remco Louwers, Industrial Engineering and Management master, 1994**, started as sales director with Danone in Germany. Before he came to work for Danone, he was, amongst other things, CEO of German publisher Groh Verlag and co-founder of coaching company Coach me if you can.
- **Ernst den Hartigh, Mechanical Engineering master, 1981**, is Chief Operating Officer with BG Europe E&P in Aberdeen as of 1 July 2014. He has been working for the BG Group for several years. After obtaining his master's degree in Mechanical Engineering in 1983, den Hartigh started his career with Shell.
- Since August 2014 **Malindi Nkambule, Chemical Engineering master, 2005**, is senior manager with Hudaco Industries in Johannesburg. In 2005 she obtained her master's degree in Chemical Engineering at the UT. After that, she continued her education in Enschede with a PDEng programme in Process Development & Design.
- **Michael de Braaf, Chemical Engineering, 1983**, has been the CEO of Swiss chemistry company Sukano since August 2014. He was working there as the head of sales and marketing since March 2014. De Braaf has also worked for Clariant and The Dow Chemical Company.
- As of August 2014 **Ruud van Henten, Industrial Engineering and Management, 1994**, has been working as Associate Director Business Markets for National Australia Bank in Melbourne. He previously worked for Saudi Hollandi Bank, the Saudi British Bank and ABN Amro.
- Starting in August 2014, **Elsbeth Akkerman, European Public Administration, 1997** is the permanent representative of the Ministry of Foreign Affairs with the World Trade Organization and head of the department of Economic Affairs. Since March 2011, she was already working for the same ministry as interim director International Market Regulation and Trade Politics.
- In August 2014 **Peter Schulein, Computer Science, 1985**, started as Director of Research: Earth, Life and Social Sciences with the Netherlands Organization for Applied Scientific Research (TNO). Schulein previously served as Director of Research for Behavioral and Societal Sciences.
- **Bernd Krause, Chemical Engineering, 2001**, became the Senior Director R&D with Baxter International in Stuttgart in September 2014. In 2001, he obtained his doctorate at the UT in the field of Membrane Technology.
- As of September 2014 **Isabelle Meijer, Chemical Engineering, 1996**, is the Chief Technology Officer for Sekisui Alveo in Zürich. Meijer has been working as an independent consultant since 2008. Before that, she had been working for Sekisui Alveo for over ten years.
- **Joep van Beurden, Applied Physics, 1982**, has been the CEO of British bluetooth specialist CSR since November 2007. In October 2014 CSR was sold for 2.5 billion dollars to American chip maker Qualcomm.
- In November 2014 the book *8 essentiële stappen voor leiders van de toekomst* of **Michael Jongeneel, Computer Science, 1998** (general director of Triodos Investment Management BV) and Guido van de Wiel (Wheel Productions) was published. Before he came to Triodos, Jongeneel worked as a consultant with Accenture and as a manager with McKinsey.
- In February 2015 **Astrid Geerts, Applied Mathematics, 2012**, will ride a bike on a monster tour of 750 kilometres through the Kenyan interior. She does this to raise money for the construction of a water supply in the village of Maai Mahiu. More information can be found at www.facebook.com/AstridFietst.

You can find the latest people-related news on twitter.com/alumniUTwente.

Have you yourself begun a new job? Do you know someone who has done something special or won a great award?

Please send your news to alumni@utwente.nl





MAKE IT POSSIBLE!

Maurice Essers, director of the University Fund Twente

Once, I too lived and studied on the campus of the University of Twente - a life-changing experience! As of 1 July I contribute to the further growth and success of our University as director of the University Fund Twente. I am quite proud, especially considering the fund's history. It was established 65 years ago on the initiative of the Twente steel and textile industry, with the realisation of a technical university of applied sciences in Twente as its goal. These companies, the 'founders', were therefore at the basis of the current University of Twente, and we certainly have cause to be grateful to these pioneers. Through the years many companies and private donors followed in the footsteps of the founders. They all contribute to the success of this entrepreneurial University, and to a life-changing experience for the students. A great foundation to continue building on! m.l.g.essers@utwente.nl

"We should be grateful to the pioneers"



THE UNIVERSITY OF TWENTE MAKES A DIFFERENCE! ARE YOU?

Unique projects are made possible thanks to the contributions and the involvement of alumni of the University of Twente. This year the University Fund Twente will once again raise money within the alumni community. Participate and support these four exceptional projects!



STICKING PLASTERS AGAINST ARTHROSIS

Professor Marcel Karperien wants to speed up work related to arthrosis, a rheumatological condition that affects over a million people in the Netherlands. The solution he has developed is an injectable plaster which stimulates the restoration of broken cartilage in joints. Before patients can benefit from this discovery additional research is needed and extensive tests need to be performed. More information on his research can be found on page 36.

UNIVERSITY FUND SCHOLARSHIP

A new scholarship has been established for students who have a lot of talent and motivation but lack the means to pay the tuition fees: the University Fund Scholarship. The scholarship provides the opportunity for both Dutch and international students to attend the prestigious ATLAS University College.

GREEN TEAM TWENTE

The students of the Green Team Twente are building a car that runs on hydrogen. The team wants to show that this sustainable fuel is a clean competitor for the current fossil fuels during an international race. The project offers young academics the amazing opportunity to delve into the subject of sustainable energy and the energy sources of the future.

SCIENCE ON TOUR

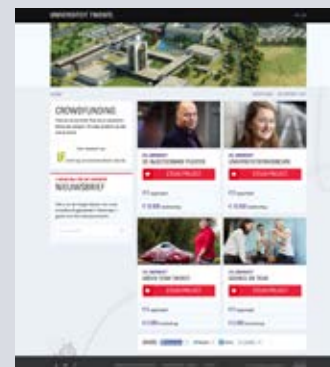
Despite a great societal need for well-educated technicians the engineering and technology studies continue to lack in popularity. In order to kindle the interest and enthusiasm of youngsters for the possibilities and studies in engineering and technology, fifty students of the Science on Tour team perform demonstrations and experiments at locations throughout the country. In order to perform more experiments and reach more youngsters your contribution is essential!

Do you also want to make a difference? Go to www.utwente.nl/alumni and donate to the project of your choice! You can also transfer your donation to NL09ABNA0592719189 in the name of Stichting Universiteitsfonds Twente in Enschede, stating the name of the project. Thanks a lot for your involvement!

CROWDFUNDING FOR THE UT

Crowdfunding is in the news a lot, especially since Obama's elections campaign of 2008 and the launch of crowdfunding platform Kickstarter.com in 2009. By now there have been many success stories. One example is the story of the UT students who raised hundreds of thousands for their 'Homey', a device with which almost all appliances in the house can be operated by voice command. In the meantime, crowdfunding is employed for many different purposes, including the charitable sector. In the latter case, the giver of course cannot expect something in return, but donates for personal or societal reasons. For example, to life-saving research, or to give a student the same great time while studying as the giver has had themselves.

The University Fund sees crowdfunding as a new way to involve alumni and partners with the UT, as it offers the opportunity to show the projects for which funds are raised in good order. Furthermore, it increases the sense of involvement for contributors: instead of making a yearly donation contributors can choose to support multiple individual projects. The University Fund also hopes to appeal to alumni and partners who have not yet decided to donate in a structural manner. Check it out at www.steunutwente.nl and spread the word!





PROFESSOR DE WINTER AWARD FOR SÉVERINE LE GAC AND MARIEKE HUISMAN

The board of the University Fund Twente has awarded the Professor De Winter Award 2014 to UT researchers Séverine Le Gac and Marieke Huisman. A shared first place.

The Professor De Winter Award, named after the professor who passed away in 2005, was awarded for the eighth time during the Dies Natalis celebrations. It is an international publication award for female top talent, intended as recognition for excellent academic research and as incentive for the further development of an academic career. The award consists of a sum of € 2,500 and has been made possible from the legacy of Ms De Winter, who passed away in 2005.

The jury, led by Rector Magnificus Ed Brinksma, regard Séverine Le Gac and Marieke Huisman as belonging to the academic top of their generation. The jury has additional appreciation for the fact that both researchers are actively working towards kindling the interest for science and technology in young children.

Séverine Le Gac moved from Paris to Twente in 2005, after obtaining her doctorate, because of the University of Twente's excellent reputation in her field of research, nanotechnology. Now she is senior lecturer at the MESA+ Institute for Nanotechnology and leads her own interdisciplinary research group, Microfluidics for Nanomedicine, and the spearhead 'Nanomedicine', that unites researchers from both the MESA+ and MIRA institutes. Her group is a part of the BIOS Lab on a Chip group of Albert van den Berg.

Le Gac received the award for her article 'A microfluidic system supports single mouse embryo culture leading to full-term development', which was published in RSC Advances, the journal of the Royal Society of Chemistry. In this article she reports on her research into the implantation of a single embryo in mice, a step that could be of great

importance for human artificial reproduction, seeing as pregnancies with multiple foetuses often have complications.

According to the jury, Le Gac with her publication shows that she employs modern technologies to seek solutions for relevant problems. In addition she seeks to collaborate with international experts and is especially driven and inspiring for young researchers. Due to her intensive an active way of (international) networking she is in contact with leading researchers in the field and manages to draw promising talent to the UT.

Marieke Huisman obtained her doctorate in Nijmegen, then moved to France and subsequently came to Twente. When she was ten, Marieke typed programme rules from a book into her Commodore computer. Now she designs tools that help programmers to make software free from mistakes. Huisman has been senior lecturer at the University of Twente since 2008, as a member of the Formal Methods and Tools research group of Jacco van der Pol within research institute CTIT.

Huisman receives the Professor De Winter Award for her article 'Specification and Verification of GPU Programs', which has been published in the renowned journal Science of Computer Programming. Her research belongs to the top in the field of program verification. She is specialized in verification of 'multithreaded programs': programs in which multiple calculations are performed at the same time on a shared memory. These parallel calculations make computers faster, but also more vulnerable.

According to the jury Huisman has clearly had a leading role in the realisation of the publication, and she is the expert in the field of the logic used.

NEW: PETER RIEZEBOS FUND

Peter Riezebos (1980) is a multidisciplinary scientist and entrepreneur with a great affinity with education. His reasons for this are myriad. Riezebos' development from drop-out to international and interdisciplinary scientist is sensational, bizarre and inspiring. In his book *Van Mavo tot Harvard* (2014) he tells about his clinical admission, the diagnoses (ADHD, Asperger syndrome), and how he turned these obstacles to learning into gifts with which he could excel in his studies. Between 2006 and 2014 he studied Psychology, Communication Studies, Business Administration and Philosophy, mainly at the University of Twente. He also excelled in various extra-curricular activities.

The presentation of his book was reason for Riezebos to create the Peter Riezebos Fund. With part of the proceeds from his book, from lectures and the sale of his artwork he wants to financially and emotionally support driven and talented students who may or may not have obstacles to learning. By establishing this fund, Riezebos hopes to do something for the University of Twente in return, because the University adopted a flexible and facilitating attitude in his special learning track. But he wants to especially support students in situations in which the regular educational programme does not provide. Riezebos: "Because of my personal



experiences I know that people approach learning very differently. It is important that everyone can study and learn in the way that most suits them. I had that luck."

If you would like to contribute to or receive a contribution from the Peter Riezebos Fund, you can contact the University Fund. The book *Van Mavo tot Harvard* can be ordered at www.vanmavotottharvard.nl.

DO YOU ALSO WANT TO ESTABLISH A PERSONAL FUND?

You can support the University of Twente with a one-off donation, periodical donations or a legacy to the University Fund. It is also possible to establish, within the University Fund's objectives, a personal fund of which you determine the name and goal.

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SDIES

GLASS ARTISTS



They are only 26 years old, but their occupation is centuries old. Roy Kooijman and Tom Buitenhuis are the glass artists of the University of Twente. A traditional craft in service of modern science. BY Marco Krijnsen PHOTOS Eric Brinkhorst

Recently the request for making an aorta out of glass came from the faculty of Technical Medicine. The students could use the glass aorta to practise inserting a stent. After making the necessary designs and calculations Roy Kooijman got to work. The glass aorta can be seen alongside the other products in the display case before their workshop in the Carré building.

The glass instrument workshop (part of the Techno Centre for Education and Research) is abuzz

with a to-and-fro of researchers. They require a specific object made of glass for their often trail-blazing experiments. Roy and Tom's job is to convert that technical question into a complex and unique product. "You make something that has never been done before. On the cusp of what is possible. You are never certain whether it will succeed. It is a matter of seeing, hearing and feeling the material."

Once, 22 people worked at the glass instrument workshop of the

University. Now Roy and Tom, both educated at the Leiden instrument maker school, are working towards breathing new life into the old craft. Roy is knowledgeable about warm glass, cold glass, cutting and polishing. Tom is specialized in metalworking in addition to cold glass. "We complement each other, so we can create very complex arrangements together. Even with new materials, such as ceramics and silicon carbide. This is a great profession. A passion more than work, really."



More information about the PDEng and the degree programmes below can be found at: www.utwente.nl/pdeng.

- Civil Engineering
- Energy & Process engineering
- Robotics
- Maintenance
- Healthcare Logistics

For organizations and companies seeking solutions for a specific technological problem or a challenging design issue a PDEng trainee can be just the thing. BY Lidewey van Noord PHOTOS Rikkert Harink

CUSTOM-MADE FOR COMPANIES

PDEng stands for Professional Doctorate in Engineering. This post-master's programme in technological design is completely focused on finding a high-quality solution for the client's issue. Programme coordinator Timo Meinders: "Think, for example, of a company that wishes to design a rehabilitation robot, or an information system, but also of an offshore company that is searching for a method to enable them to better and faster construct pipes under water in all weather conditions.

Design assignment

In most cases the companies themselves provide the design assignment and the University of Twente appoints a PDEng trainee to carry out the assignment. Companies can also choose to have a high potential take a PDEng programme. During two years the trainee works on the development of the required design. In addition they also take courses to gain broader or

more in-depth knowledge. In addition the trainee gains the knowledge and experience to be able to supervise new design processes in the future. Meinders: "Organizations and companies can benefit a lot from a PDEng traineeship. The trainees can use the network of the University of Twente, they have access to the most recent knowledge, and the intellectual property rights of the designs accrue fully to the company."

Various disciplines

The University of Twente has developed a technological design programme in five specialities: Civil Engineering, Energy & Process Engineering, Maintenance, Robotics and Healthcare Logistics. These programmes are multidisciplinary in nature. This, and the shorter duration of the programme, form the main differences as compared to a PhD position. Meinders: "A PhD candidate will concentrate on a

specific issue within their own discipline for four years, a PDEng trainee on the other hand is encouraged to also train themselves in other disciplines. For example, if someone wants to design a rehabilitation robot that will help a patient retrain the arm muscles, they require knowledge of various disciplines: process engineering, mechanics and biomedical sciences. The PDEng trainee is trained to know enough of all disciplines to be able to function as a valuable sparring partner for all involved parties in a design team."

A PDEng programme can theoretically be followed part-time, but the University of Twente recommends any students to complete the programme within a maximum of three years. Meinders: "It is an intensive programme and it is, of course, in the interest of the client that the steps necessary for the development of the design are taken on time."



For more information contact Timo Meinders: v.t.meinders@utwente.nl

MARCEL KARPERIEN WANTS TO BANISH ARTHROSIS FROM THE WORLD

BIOTOPE

To the surprise of many, in 2007, Marcel Karperien traded the labs of the classic universities for the then still unknown MIRA research institute of the UT. He risked his neck for a vision: a biotechnological breakthrough in the treatment of degenerative cartilage diseases such as arthrosis. He expects that his 'injectable plaster' can be applied in the clinics in 2018. BY Kees de Rijk PHOTOS Eric Brinkhorst

"There is cut-throat competition now that nearly all long-term funding schemes have been lost"

INJECTABLE PLASTER

Arthrosis is a chronic condition of the cartilage, which becomes increasingly more thin and soft. Over a million Dutch people suffer from pain and limitations in movement caused by arthrosis. Karperien's group developed an injectable hydrogel which can be compared to epoxy glue. This hydrogel can be applied to the damaged cartilage like a liquid plaster during a keyhole surgery. A bonding and hardening reaction takes place, to ensure that the damaged cartilage is protected against further mechanical erosion and can recover.

[see also www.utwente.nl/mira/hthf]

INTWENTE

Professor H.B.J. (Marcel) Karperien, PhD (1967), has been leading the Developmental BioEngineering department of the UT's MIRA research institute since 2012. He studied Biology in Utrecht and obtained his doctorate at the Hubrecht Institute for developmental biology and stem cell research.

As postdoc at the endocrinology department of the Leiden University Medical Center he focused first on understanding the cellular and molecular foundation of skeletal development, and then concentrating on hyaline cartilage formation. He saw the possible meaning of this knowledge for the treatment of degenerative joint conditions, but realized that the addition of technology was essential in this. He tried to bring the technology to Leiden, but when he did not succeed in doing so, the decision to move shop to Twente was quickly made.

Conviction

"The foundation of that decision lay in my conviction that real breakthroughs in the clinics will stem from the smart combination of biomedical knowledge and new technologies," explains Karperien. And the only place where that was already being implemented on any scale was with van Blitterswijk's group, in Twente. "They were well ahead of the troops already in 2007," Karperien says. "There was little to no sympathy for my transfer to a technical university at that time; the classical academic world

viewed this action with some disdain." Seven years later Karperien sees his conviction borne out on all sides: "By now the academic hospitals have also come to the conclusion that without the addition of new technology they will not get very far."

Multidisciplinary

After coming to Twente in 2007 Karperien established his own multidisciplinary research group that combines the latest insights in the field of polymer chemistry and biomaterials with the knowledge of tissue engineering and of the developmental biology of bone and cartilage. Karperien's group - which currently consists of 13 PhD candidates - has been independent since 2012. An important part of the research is focused on the development of innovative treatment methods for degenerative cartilage diseases. For example, injectable plaster was developed for the treatment of arthrosis (see text box). Continuing from that, other applications of these so-called hydrogels are being investigated, both for transplanting Islets of Langerhans or closing badly healing skin wounds in Diabetes Type I patients, or in spray form for application on burns.

Over the wall

Having this promising research continue and keeping all those researchers working requires money, Karperien knows: "A lot of money, preferably for a longer term. However, in the current competitive climate this does not simply grow

on trees." Karperien approached the Dutch Arthritis Foundation to garner their interest for his research. This was not achieved without a struggle: "I had to convince them that research into arthritis can also be properly performed in a non-clinical environment. They dared take the risk and this shows some vision: they saw that clinical research has only provided limited breakthroughs in the last few decades, and dared to look over the wall and join on a road yet untravelled. That was a great thing to do."

"Research becomes fragmented and the continuity is under threat"

Competition

More broadly speaking, Karperien deems the situation on the research funding market to be less than healthy: "There is cut-throat competition now that nearly all long-term funding schemes have been lost. The consequence is that researchers put a lot of time and effort into writing excellent proposals, even though the chance that these will be successful are extremely small. Research becomes fragmented and the continuity is under threat."

Nevertheless Karperien is optimistic: "We are still able to start three Research Assistant projects every year. We hope to secure the continuity of our research through presentations to philanthropists and crowdfunding. We want to banish arthrosis no matter what."

How can I help?

Do you want to help Professor Marcel Karperien accelerate his work? Then support his research. You can find out how on the website www.utwente.nl/mira/artrose/ (in Dutch). You can also read about the injectable plaster he is developing on this site.

DIRK VAN SLOOTEN WITH VOPAK FOR 34 YEARS

BRINGING PEOPLE TOGETHER

For Dirk van Slooten, the combination of mechanical engineering, industrial engineering and management and extracurriculum activities on the side constituted the perfect preparation for his career, which had him work for one company for 34 years and made it to all corners of the organization and the world. BY Hans van Eerden PHOTOS Kees Bennema

"I was good at tinkering and wanted to work in the corporate sector," van Slooten says, to explain his decision to go to Twente. After the general, introductory year he started the mechanical engineering programme. I have learned to think systemically, read drawings and understand constructions." He obtained his bachelor's degree, obtained his engineer's degree at industrial engineering and management and left Twente. A sailing fanatic, I thought to play with boats at the Van Ommeren shipping company in Rotterdam. But I came to work at their tank storage for oil and chemistry."

Incognito

Last year Van Slooten retired at the same company, now called Vopak. He looks back on his career with satisfaction. Life as an expat, together with his family, he calls "incredibly enriching".

He learned to direct teams and to negotiate with various parties. However, it was not always fun and games. In Mexico, where he bought an LNG terminal, he learned to walk around incognito, in Rotterdam people went on strike against him and he was threatened. "If you have to make a clean sweep through a company they will not always thank you for it. Luckily nothing really bad ever happened."

Gate Terminal

Liquid natural gas (LNG) crosses his path in 2005. Interesting, for gas is the least-polluting fuel, gas-fuelled

plants can change up and down quickly, and LNG is not tied to a pipeline for distribution. "That will be the key to an open gas market." Vopak asked him to set up a new company in LNG. The result was the construction of the Gate Terminal in Rotterdam. "I had three top specialists from the gas sector working for me very quickly. The art lies in always connecting with the right people, to ensure something happens."

Exciting

He succeeded in delivering the terminal - with a billion euros in investments tied into it - according to plan and within the budget. Together with the Mexican LNG terminal, a new division was born: the pinnacle of 34 years at Van Ommeren/Vopak. Van Slooten

remains active, however, for instance as chair of the International Gas Union Global LNG Committee. "Incredibly interesting, what with the current geopolitical imbroglio in the field of energy. The political tension also shows up in the committee, I like that. I am seen as a neutral figure who can bring the conflicting interests together."

Profile

"To this day I have benefited from my education and organizational experiences in Twente," Dirk van Slooten explains. Still, he would like to add a critical comment. "I have never encountered the UT abroad. The University, with its two faces, has difficulty positioning and advertising itself outside of Twente and immediate surroundings. This is a shame, as the amount of knowledge available here may shame all other comers. Setting themselves up as entrepreneurial university is great! Expand on that and make it a reality, cooperating both with SMEs and with the Shells and Unilevers of this world, so its reach will extend beyond its little corner of the world. I would like to discuss this with the Executive Board and contribute to it."



“The art lies in always connecting with the right people, to ensure something happens”



Dirk van Slooten (1949) graduated in 1979 at the Technische Hogeschool Twente (THT) and started to work at the Rotterdam-based Van Ommeren shipping and tank storage company. He was an expat in Singapore and London and went into retirement as global director Vopak LNG Holding in 2013 at the same company, now called Vopak after the merger with storage and trade company Pakhoed. Now, he is an independent consultant and chair of the International Gas Union Global LNG Committee.

50 YEARS CNØDDE, 50 YEARS ORGANIZER

During the first years of his study Dirk van Slooten already demonstrated being a budding administrator and manager. He managed a catering employment agency for students, was board member of the hockey club and became chair of the water ski club. “I was not into water skiing at all, but they had an administrative problem. I was sort of an organizer on campus. The THT was still under construction and there were funds available, so a lot could be arranged.” In 1970 he was the co-founder of Cnødde. “It started out as a social club and became a special club of entrepreneurial people. A close-knit group which now boasts over 200 members and former members. In 2020 we want to celebrate the fiftieth anniversary by setting up something big. Something to tie in with the UT being an entrepreneurial university. We want to spread the word that it is happening in Twente.” In 50 years from personal interest and sociability to public interest.



LIVING IN THE LAP



Patatras is a house with a long history. Once, this building on the Emmastraat housed monks, but it has been a student house since the 1970s. The current residents of Patatras do not live a monk's life, however. On the contrary: they are living in the lap of luxury. BY Lidewey van Noord PHOTOS Rikkert Harink

The front door of the town house is covered in name plates of all former residents (except one, as I discover later). A nice symbol, as this way it is like they are still living there a little. Melvin Angelovski opens the door for me, and together with Willem Rijssenbeek we sit down at the dinner table in the cosy, tidy living room.

Melvin: "We are living here with eight guys, aged between 18 and 24." It's a sociable place and we mess around a lot, but we also have a strict cleaning and tidying regime."

Willem: "This may be the most beautiful house of Enschede - anyone who leaves to live on their own usually suffers a loss regarding housing conditions and luxury. We are proud of it and, thus, careful with it."

DIY weekend

The house is owned by the Patatras Foundation. Bram Adema (resident from 1985 to 1989, now director and owner of CFP Green Buildings and board member of the Dutch Green Building Council): "I was only living in the house for two weeks, in 1985, when the yearly reunion took place. Some forty former residents were present, including all the founders of the house. They asked us

whether we wanted to ensure that the house would be bought, with their help. One year later the Patatras Foundation was established and the house was bought. Hopefully we are assured an annual reunion for centuries to come."

The fact that Patatras is a foundation house is to the great benefit of the residents. Melvin: "The proceeds from renting it out are invested into the house. That way we can tackle large projects during the annual DIY weekend." Willem: "This year we ploughed through the entire garden to put down a high voltage current cable for the jacuzzi. Now there is an outside shower with warm water, so that you can shower after bathing. A DIY weekend like this is a lot of fun: The youngest make sure there is food and beer during the day, and slogging through the mud together for a couple of days knits the group together. Next year we want to build an outside kitchen."

The housemates keep a weather eye on each other. Melvin: "There are no TVs in the bedrooms, we do not want the guys to hide. Of course you can withdraw once in a while, but if you have nothing to do, you can

OF LUXURY



“We have ploughed through the entire garden to put down a highvoltage current cable for the jacuzzi”

hang out on the couch here. That way you keep in touch. You can tell your housemates everything, that is the feeling we want to create, to ensure things are not bottled up.”

Willem: “Even if you did not pass your exams, we think you have to say so. If you are structurally procrastinating, it is the housemates’ job to say: Get yourself to the library and get to studying. And don’t come back till dinner.”

Golfing company

The ties with former residents are strong. Melvin: “For example, Kees van der Graaf, who is now the chair of the Supervisory Board of the UT, sends a personal letter every year around Christmas, in which he always references the house. It is great that he takes the time to do that.” Many former residents are still in contact with each other as well. Alexander Mackay, (resident in 1971 and 1972, now director and major shareholder in several business in the oil, gas and mining industry): “A group of former residents together forms a golfing company and we play for the Harrie de Bonte Cup twice a year. We also sail the Patatras regatta in

Friesland every year, lead by Flip Detiger.” Mackay loves to revisit the house: “You are always welcomed with open arms and sometimes you can even explain some of the paintings and pictures on the wall to the new residents.”

I am given a tour, from the house car on the street in front to the jacuzzi in the backyard. Past a beautiful kitchen with a shiny new coffee maker, two bathrooms and to top it all off the room of the eldest resident, with a view of the garden, a sitting area and a library. Just as I start to wonder if there are really students living here, I luckily come across several less-chic things. In the hall hangs a chandelier covered in captured women’s underwear and the walls of one of the toilets are covered with newspaper articles about Willem Holleeder - “he lived here once, but his name plate was taken from the door”. And then a most special corner of the garden is pointed out to me: the ‘puke spot’, that is dug out during drinking sprees. Melvin, as he laughs: “It’s a breeding ground for sorrel.”



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"This sort of 'data sniffing',
how far can you go with it?"

NEW SCIENTIFIC DIRECTOR CTIT:

Follow people in crowds with special badges or via smartphones. That is the 'hypertechnical' research Maarten van Steen focused on at the VU University in Amsterdam. He will transfer to the UT at the beginning of 2015 and will become the new scientific director of CTIT. BY Hans van Eerden PHOTOS Kees Bennema

SOCIETY AND TWENTE ARE A MATCH

Maarten van Steen studied Applied Mathematics in Twente. "I was from Hengelo and wanted to leave the region after university preparatory education, but for me it was simply the best programme." After graduating he switched to computer science and obtained his doctorate in Leiden. At the Netherlands Organization for Applied Scientific Research (TNO) he learned management and via the Erasmus University he ended up at the VU University. "With Andy Tanenbaum, authority in operating systems. I 'copied' his academic mentality: testing ideas by creating things and write only one paper on every problem. There may be less output, but it also results in more focused citations."

Internet of Things

In Amsterdam, van Steen concentrated on distributed systems: machines, such as computers or sensors, connected via (wireless) internet. Think of the 'Internet of Things' or of people who are equipped with badges

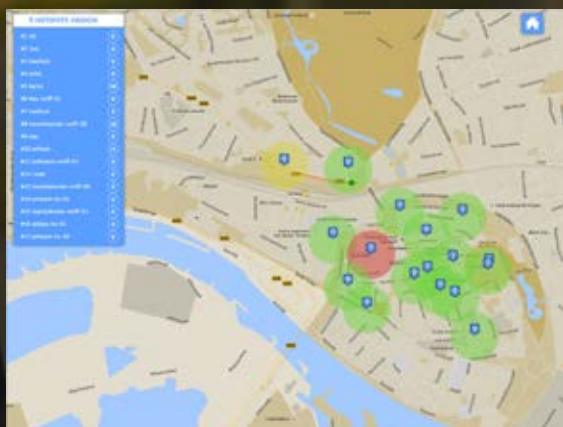
that communicate between themselves. Such as in the Cobra Museum in Amstelveen, where his group will follow the viewing behaviour and walking routes of visitors. Questions of a technical nature were about efficient data collection, smart analysis and minimal energy consumption. "For me it will truly become interesting if I can help researchers from other domains take a new step forward."

Multidisciplinary

People can also be followed via their smartphone, unsolicited, for example to monitor their behaviour at events or on shopping streets. That is where privacy becomes involved. "This sort of 'data sniffing', how far can you go with it? For an experiment in Arnhem, following visitors of the World Living Statues Festival, I am negotiating with the alderman and lawyers. I come from the world of technology, but what I do there can have social impact. The VU University is also working on this, but this is a typical discussion



This multi-sensor badge contains, amongst other things, a proximity sensor, an accelerometer, a microphone, and a led screen for feedback. It communicates with other machines via a link-level protocol and is only active for 70 milliseconds in order to spare the battery.



'Data sniffing': the behaviour of visitors of the World Living Statues Festival in Arnhem is being monitored, for example through their smartphone.

for the UT. The UT is used to have multidisciplinary discussions about these issues. Society and Twente are a match."

Strong club

Starting on 1 January, Maarten van Steen can really let himself go. At that time he will become scientific director of CTIT, Centre for Telematics and Information Technology. "A strong club of scientists. The challenge is to give it more of a punch. And I think the best way to do that is to name the big social issues to which CTIT can contribute. Think of 'smart societies'. Interpretation will follow on its own, from already selected academic themes, such as human-technology interaction and cyber-physical systems." Van Steen will continue to do research. "Collaboration with Twente social scientists is a no-brainer. I think it can be rolled out to companies and institutes relatively quickly, but I do not have a lot of sense of what's possible in this respect yet. I hope to learn everything concerning spin-offs here."

CALENDAR

16 January 2015

World Café: Neurotechnology & Society. Design your future!

28 January

Twents Meesterschap

19 February

Human, Management & Medical Practitioners Company Days Twente

4-5 March

Information fair
Bedrijvendagen Twente

10 April

Conference Public Management 'Vision 2075'

25 April

Batavierenrace

May 2015

Innovation Lecture

For more information, go to
www.utwente.nl/evenementen

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SPIN-OFF

MEGA MICROBUBBLE TECHNIQUE

BY Hans van Eerden PHOTO Kees Bennema

Thanks to a harmless contrast agent - a fluid full of gas bubbles - urologists no longer have to blindly inject into a possibly cancerous prostate. Gas bubbles resonate sound waves and are therefore perfectly suited for echography, which allows for the imaging of the blood flow through organs. However, to create sharp ultrasound images, all bubbles need to be the exact same size. And the art of creating these so-called 'monodisperse' bubbles is fully mastered by University of Twente spin-off company Tide Microfluidics.

A lab-on-a-chip injects minuscule gas bubbles into a fluid at a superquick speed - one million bubbles per second. This is how, very controlled, the contrast agent is created. In addition to echography, the bubbles can be used for other medical imaging or treatment purposes. You can make the bubbles magnetic or fluorescent, or equip them with medicines or biomarkers.

Tide, lead by Wim van Hoeve (UT Applied Physics master, 2006, and PhD, 2011) and Bernd Vinke (UT Public Policy and Public Administration master, 2000), was set up in 2011 and is located in The Gallery, close to Kennispark Twente. Aided by the Kennispark Twente TOP programme and two STW Valorisation Grants, they have now brought the technology to the market - to acclaim. "A London professor in radiology phoned within a day: 'Very exciting stuff!' As far as this professor is concerned, it will be introduced in clinics as soon as possible." The CMI Center for Medical Imaging affiliated with the UT is also enthusiastic. "They see a bright future for a mobile imaging technique such as echography." At the COMS 2014 conference in the United States, Tide recently won the Young Technology Award.



"Bubbles-on-a-chip"

For more information, go to
www.tidemicrofluidics.nl

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