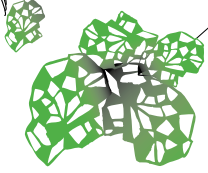


UNIVERSITY OF TWENTE.



INNOVATION LECTURE with Neelie Kroes
YORI KAMPHUIS: Futurist of the Year
CENTRES OF EXPERTISE ON THE MAP

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EPILOGUE

After ten years, I will be saying a fond farewell to the University of Twente on 30 September of this year and passing the baton to Mirjam Bult. That makes this foreword in our magazine for alumni and partners something of a personal epilogue as well. In this issue's dossier, we take an in-depth look at several of our centres of expertise. If that conjures images of students and academic researchers working away in isolated labs, think again. These are high-tech facilities that put themselves and their expertise at the disposal of a wide array of businesses. As it turns out, the exchange works both ways. Their open collaborations are enabling us to generate additional value for both industry and our own research, while at the same time nourishing our culture of enterprise.

This is a clear illustration of what makes our buildings so much more than mere piles of brick and mortar packed full of modern equipment. At Twente, we see our land and buildings (one of the key responsibilities of my own job) as a means to build bridges between our staff, our students and the business community. A means to enable everyone to maximize their potential.

On first coming to UT ten years ago, I was hugely impressed by the spaces and possibilities available

here. The campus is an oasis – a beautiful place to live, to study, to work, to play sports and to enjoy a plethora of cultural activities. If you haven't seen it in a while, let me assure you that a lot has changed in ten years. New buildings, old buildings that have been spruced up, improvements to various sports and cultural facilities and a campus that is more attractive than ever. Yet perhaps one of the most important developments to have taken place during this last decade is the links that have been forged between our campus and the Business and Science Park. Not only the physical connection that was created when the overpass separating the two was torn down, but more crucially the ties formed upon the foundation of Knowledge Park Twente. Joining forces with the municipal and provincial authorities and local businesses, we have completed a master plan to build a dynamic location where almost 400 organizations are working on innovations that make a difference.

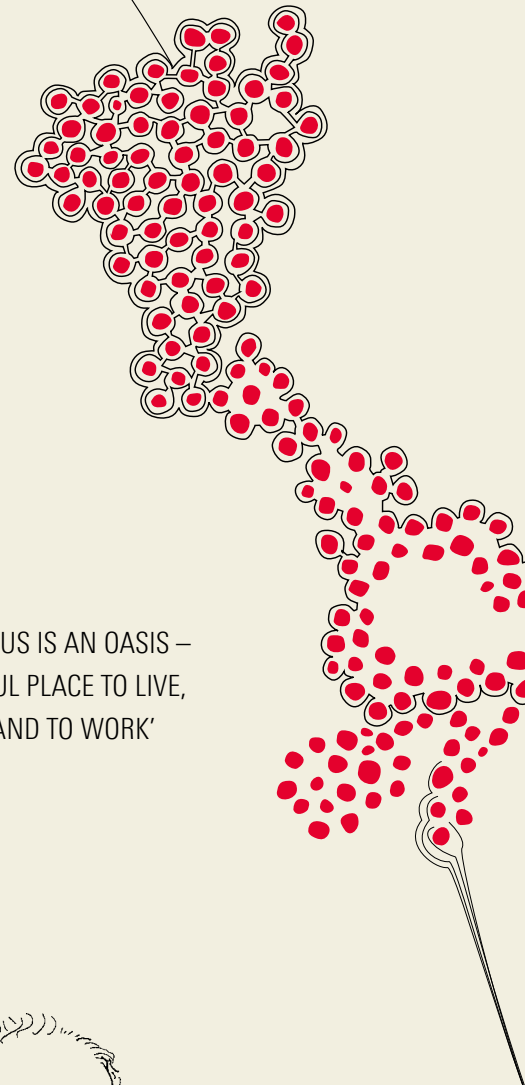
An inspiring location, one that fosters interaction and offers a home for enterprising, creative minds eager to put their knowledge to work – quite literally: since its inauguration, this endeavour has enabled us to help create nearly 7,000 skilled jobs. ●

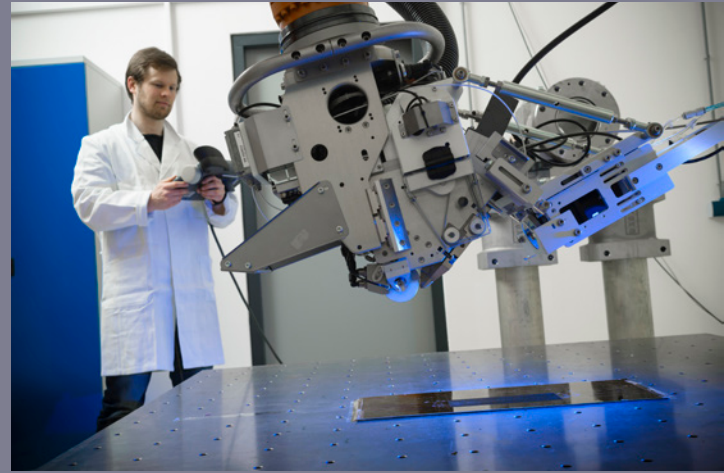
'THE CAMPUS IS AN OASIS –
A BEAUTIFUL PLACE TO LIVE,
TO STUDY AND TO WORK'



KEES VAN AST

(B. 1951) HAS BEEN VICE-PRESIDENT OF THE UNIVERSITY OF TWENTE SINCE 2005.





CENTRES OF EXPERTISE

The University of Twente is home to a large number of research groups that maintain strong ties with businesses in their domain. Several groups furthermore have special facilities that other organizations can also use. UT is working on raising the profile of these centres of expertise.

TEXT **Christian Jongeneel** PHOTOS **Rikkert Harink (Design Lab)** en **Kees Bennema**

It goes without saying that a university's facilities are designed first and foremost to serve the interests of education and research. But an enterprising university also looks further: at the capacity it has available to put at the disposal of potential business partners, or even at ways to build additional capacity for this very purpose.

'This approach to facilities fits with the university's strategic business development programme, which aims to intensify ties with partners to help us achieve our mutual ambitions', explains Miriam Luizink, director of Strategic Business Development. 'Our centres of expertise offer a fertile ground for research and industry to tap into,

and a foundation to build on as they go from strength to strength.'

With seven designated centres of expertise (the list is neither exhaustive nor static), the territory covered is broad. The Nanolab, for example, is a largely open facility for external research, development and small-scale production, whereas the TPRC is a long-term alliance among partners pursuing a joint research programme. In other words, the mix of hardware and knowledge differs depending on demand from the field.

According to Luizink, 'For us as a university it's crucial to present these centres of expertise in a concerted way and to showcase all

that's on offer so external parties can see that we actually want them to come here and use the facilities on campus. Giving companies a fuller picture of what the university can do for them benefits everyone.'

Aside from casting their nets beyond the university, the centres of expertise can also learn from each other. Having been set up from their respective disciplines, it's important to avoid needless repetition of work on other fronts, such as engaging legal expertise to hammer out research contracts. A shared system for dealing with ancillary affairs frees up more time for core activities.

VERSATILE COMPOSITES

A laser tape placement robot winds thermoplastic tape containing composite fibres all lined up in one direction around a mould. Though not yet perfected, this technology will one day make it possible to quickly produce complex forms that retain their shape. 'This robot is a great example of the types of things we're working on at the ThermoPlastic composite Research Center, essentially building fundamental knowledge to advance technology in this field', explains Harald Heerink, general manager of the TPRC. As well as developing hardware, the institute is also working on simulation models and improving knowledge about composites in general. The TPRC works closely with companies such as Boeing, Koninklijke Ten Cate and Fokker Aerostructures, some of industry's most demanding end users of composite materials.



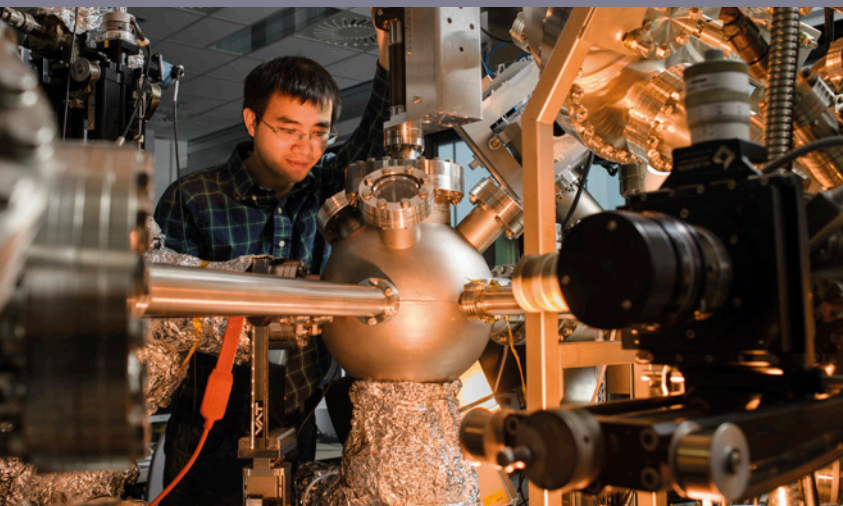
PRACTICALLY FOR REAL

A fully equipped operating room is just one of the many facilities available at the Experimental Centre for Technical Medicine (ECTM), alongside an intensive care unit, numerous medical devices and settings for experimental studies using human subjects. All offer an environment that is both realistic and safe, not only for educating and training future physicians but also for testing new concepts, such as an innovative robot that can aid in certain operations or a technique for projecting images on a patient's body.

ON THE MAP

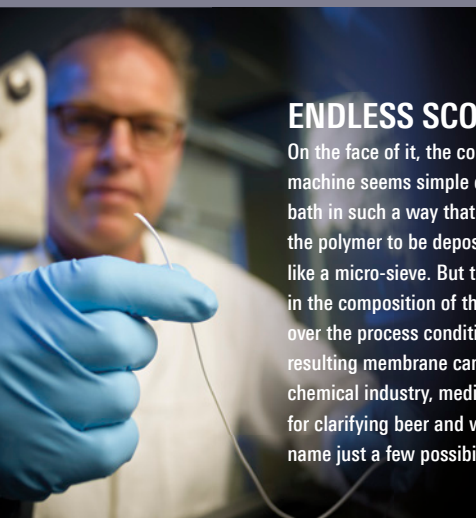
'Many of our facilities are intended primarily for teaching purposes', says department head Remke Burie. 'But of course it would be a shame to leave them idle at times we don't need them, so we make them available to other organizations and research partners. What's great about this is that external users often have totally different perspectives, so this centre has also become a hub for new ideas.'





NANOLAB

The COMAT is a piece of research equipment that makes it possible to apply an extremely thin layer of metal oxide and then study it directly at the atomic level. By looking at the quantum effects operating at this level, researchers can explore new dimensions of material use. For instance, these thin layers could provide a basis for solar cells made in shape rather than fixed in rigid panels. 'This is fundamental research and miles away from practical application', says Gerard Roelofs, head of the MESA+ NanoLab. 'However, it does show that partners can turn to us for the most advanced equipment and expertise.' Nanolab mainly helps companies with the testing of new products or small-series production, in many cases of sensors, but also of micromechanical and microfluidic structures for applications in fields such as medicine (an example is blood analyses using a chip on which the fluid is circulated).



ENDLESS SCORES OF MEMBRANES

On the face of it, the concept behind the hollow fibre spinning machine seems simple enough: extrude a polymer solution in a water bath in such a way that the interaction of water and solvent cause the polymer to be deposited and form a membrane. Effectively, it's like a micro-sieve. But that's just a fraction of the story. The crux lies in the composition of the polymer solution and the degree of control over the process conditions, which in turn determine whether the resulting membrane can be used for precision applications in the chemical industry, medical uses like removing waste from the blood, for clarifying beer and wine, or for the treatment of drinking water, to name just a few possibilities.

The equipment – not to mention the expertise behind it – is the showpiece of the European Membrane Institute. 'We're using this machine to improve existing hollow fibre membranes and to develop new ones for clients', institute manager Zandrie Borneman explains. 'Another big part of our services are membrane characterization and consultancy work, such as on how to scale up existing processes for maximum efficiency. We also develop membrane-related testing equipment that we market in collaboration with TCO. In recent years of we've done business with more than 200 companies. We're definitely open to collaboration!'

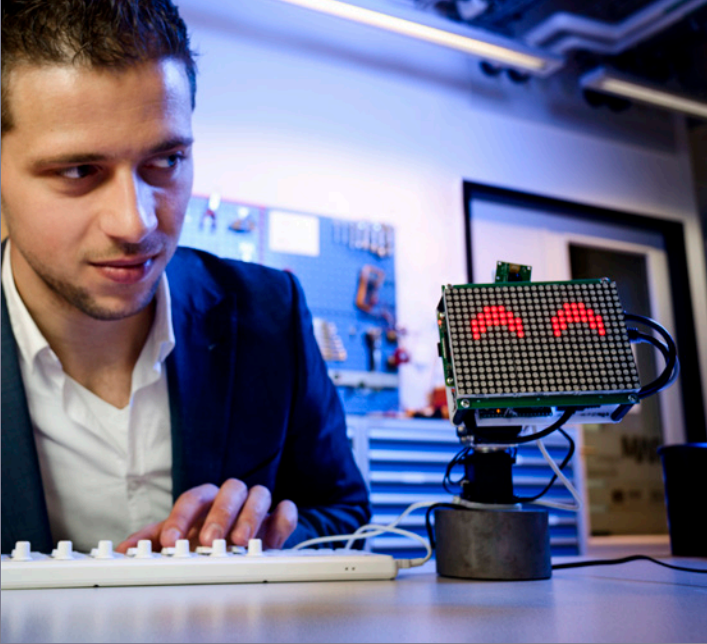
VISUAL AID FOR DECISION-MAKING

'We draw on all possible forms of virtual reality to assist people in complex decision-making processes', says Roy Damgrave, coordinator of the Virtual Reality Laboratory. 'For example, we have collaboration tables where people can work on content together, with a large screen on which everyone can follow the train of thought. We also have lots of other facilities such as touch-sensitive tables and walls at which several people can work simultaneously.' The common thread is that these tools enable multiple stakeholders to scope out a problem together, assisted by visual resources, and then search for a solution. Take a company that wants to launch a new product and has to get its marketing officer, psychologist, designer and sales representative all working on the same wavelength. Or a project developer that is bringing an architect, contractor, potential buyers and local residents together to crystallize views on a prospective building project. And it's viable for small and medium-sized enterprises, too, says Damgrave. 'Virtual reality is something you can use to visualize future scenarios, and that enables you to make better decisions about them'.



EVERYDAY ROBOTS

At the lab of the LEO Center for Service Robotics, an as-yet nameless robot displays exaggerated grimaces. 'We're doing this to study how robots can interact with people', explains project coordinator Alex van Geldrop. 'There's a mechanical dimension, obviously, but also a psychological one.' LEO earned its spurs as a centre for expertise on robotics in the eastern Netherlands and now advises businesses seeking to develop their own robots or that want ready-made practical technologies. Staying on the leading edge of the state of the art is vital, and that requires looking beyond mere mechanics. 'Take the agricultural robots that we're helping to develop', Van Geldrop says. 'At present they can only be deployed within an enclosed perimeter. But of course eventually farmers will want robots that can drive back to the shed on their own without having to worry about the kids playing out in the farmyard. We have to prepare for a world in which robots will play a much more prominent role in everyday life.'

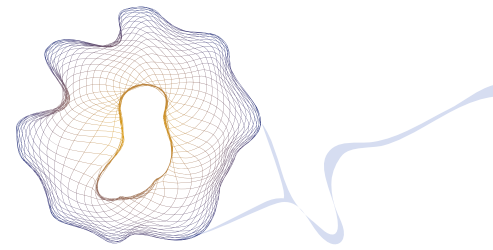


SEARCHING FOR INNOVATIVE SOLUTIONS

The Design@UT method developed by the DesignLab helps organizations to tackle complex design issues from numerous angles. The project to create a road link between Drienerlo railway station and the University of Twente is a good example. This 'Innovation Pathway' was conceived not just to link two locations, but also as a means to connect companies and institutions along the route. 'Our method looks not only at the technological design but also at social scientific aspects', clarifies Miriam Iliohan, project manager at the DesignLab. 'The designer's role in these multidisciplinary teams is to bridge the diverse disciplines. Our designers are trained to take diverse forms of knowledge and structure them in a way that points to a solution. Besides design expertise, we also have facilities like Lego tables, 3D printers and workshops to help clients crystallize their ideas.'



IN BRIEF



HACK-PROOF CREDIT CARD

Imagine a credit card that's impossible to crack. UT researchers have developed a technique that will soon make this a reality, using quantum physics. Even if they have all a card's data and its complete structure, potential hackers will be out of luck. The new method takes advantage of the fact that particles of light (photons) can be in several places at once. What makes it so great, according to research leader Pepijn Pinkse, is that this method doesn't require any secrets: 'So there are none to steal.'

SATELLITE COUNTS ANIMALS

An initial study by researchers from the ITC Faculty in Twente has discovered that satellite images can be used to measure the size of animal populations with considerable precision. Conducted at a national park in Kenya, they employed a specially developed system that automatically identifies image pixels that might be animals. Smart image analysis techniques then enabled the researchers to ascertain which ones really were animals. The results showed an average divergence of just 8.2 per cent from manual counts. This is good news, since traditional ground and air-based counting methods are not only laborious and costly, but often also disruptive to the animals themselves.



TOP PROGRAMMES

The 2015 Options Guide for Higher Education (Keuzegids Hoger Onderwijs) has awarded a 'Top Programme' rating to two Master's programmes at the University of Twente: Technical Medicine and Geo-Information Science and Earth Observation. The Guide evaluates all Master's programmes in the Netherlands to give prospective students a basis for comparison. Programmes at the University of Twente performed well, with as many as eight of the total 29 Master's programmes assessed placing first in their category.



PRINCE FRISO ENGINEER AWARD

The University of Twente received the royal honour of a visit from Princess Beatrix and Princess Mabel during the presentation of the first-ever Prince Friso Engineer Award on this year's Engineers' Day. Allard van Hoeken of Bluewater Energy Services was the

proud winner of the Engineer of the Year title for 2015. Presented by Martin van Pernis, president of the Dutch Royal Institute of Engineers (KIVI), the award is named in honour of Prince Friso, a mechanical and aerospace engineer who was a highly esteemed KIVI member.

TRAIN RECORD

Mathematics student Loes Knobben has set a new record: she was the first person ever to visit all 166 of Berlin's S-Bahn stations in just 15 hours and four minutes. She managed this feat by programming a mathematical tool to calculate the fastest route. As the S-Bahn isn't exactly famous for punctuality, she had also prepared various backup plans and laid out a route

that minimized the risk of delays. But of course she couldn't control everything. On her record-setting day, a heavy storm caused many services to be cancelled and various tracks to be blocked. Nonetheless, she managed to carve almost two hours from the existing record. Her effort has been submitted to Guinness Book of World Records.



TWENTE MAKER FESTIVAL

Bikes that can be used to drive cars, an 'experience hut' created by Communication Science students, a programming course, Solar Team Twente's solar car... all this and more assured the University of Twente a good showing at the second Twente Maker Festival. Part of a growing international tradition, the festival shines a spotlight on 'makers' and gives visitors a chance to learn about science and technology in a relaxed setting. Next year, which marks a special anniversary for the UT, the festival will be hosted on the university campus. UT already has big plans for the event.

TWENTE LAUNCHES NEW INVESTMENT FUND



In the presence of special guest Neelie Kroes, the University of Twente and Saxion University of Applied Sciences officially launched the Dutch Student Investment Fund before this year's Innovation Lecture. It marks the first startup fund of its kind to be initiated under student leadership in Europe. In the years ahead the fund is expected to invest one million euros in the form of convertible loans in promising Twente student enterprises. Both the board and the investment committee are comprised principally of students. As well as financing, the fund will also provide assistance to young entrepreneurs. Its first investment is a 40,000 euro loan to LipoCoat, a company that manufactures coatings for medical uses. Further information: www.studentinvestmentfund.nl.

Kristian Göeken is developing a device able to detect TB in locales unable to afford expensive microscopes. His clear presentation about this portable point-of-care (POC) application no bigger than a smartphone won the UT doctoral candidate this year's Simon Stevin Leerling Prize at the annual conference of the STW technology foundation. TEXT Kees de Rijk PHOTOS Gijs van Ouwerkerk

GOLD IS GREEN, OR RED

Göeken's design is suited to identifying a wide range of bacterial diseases. Based on the optical phenomenon known as Localized Surface Plasmon Resonance (LSPR), which occurs when charged nanoparticles (the sensor) 'pair up' with the genetic target material of bacteria, changing their colour from green to red, Göeken's PhD project (supervised by Ron Gill) is geared towards the early, fast, easy and inexpensive detection of TB. In the slipstream of this project he is investigating whether the test can also be used to track down *Staphylococcus aureus*, the culprit behind the mastitis (udder infection) in cows and a major problem in the dairy industry.

Duration

At present, Göeken says, there are two ways to detect tuberculosis: 'Most effective is using the polymerase chain reaction (PCR), which takes very small quantities of DNA and replicates short sections until there is enough to analyse. This is an excellent technique, but you need a lab, expensive equipment and trained people to be able to create and analyse the right samples. In areas with a high prevalence of TB, such as in parts of

Asia and Africa, you often simply haven't got those labs, expensive equipment and trained people.'

Affordable

The affordable option is to count TB bacteria under a microscope. A dye that binds specifically to TB bacteria is added to the sputum of a possible TB patient, and then the bacteria are counted under a fluorescence microscope. According to Göeken, this method is much cheaper than PCR and consequently is widely used in the field. 'The biggest limitation is that this method is not very sensitive, making it impossible to detect TB at an early stage. And terms of the efficacy of treatment, that can make a huge difference.'

Colour change

The test that Göeken is now using was developed by UT researcher Rob Kooyman and consists of adding single stranded DNA that has a specific reaction to TB RNA – a type of DNA that cells copy by the thousands – to gold nanoparticles (80nm). RNA copies flow out from fragmented TB bacteria across the gold particles, where they bind to the DNA. Amplification is achieved by getting smaller gold particles (40nm) with TB-specific DNA to

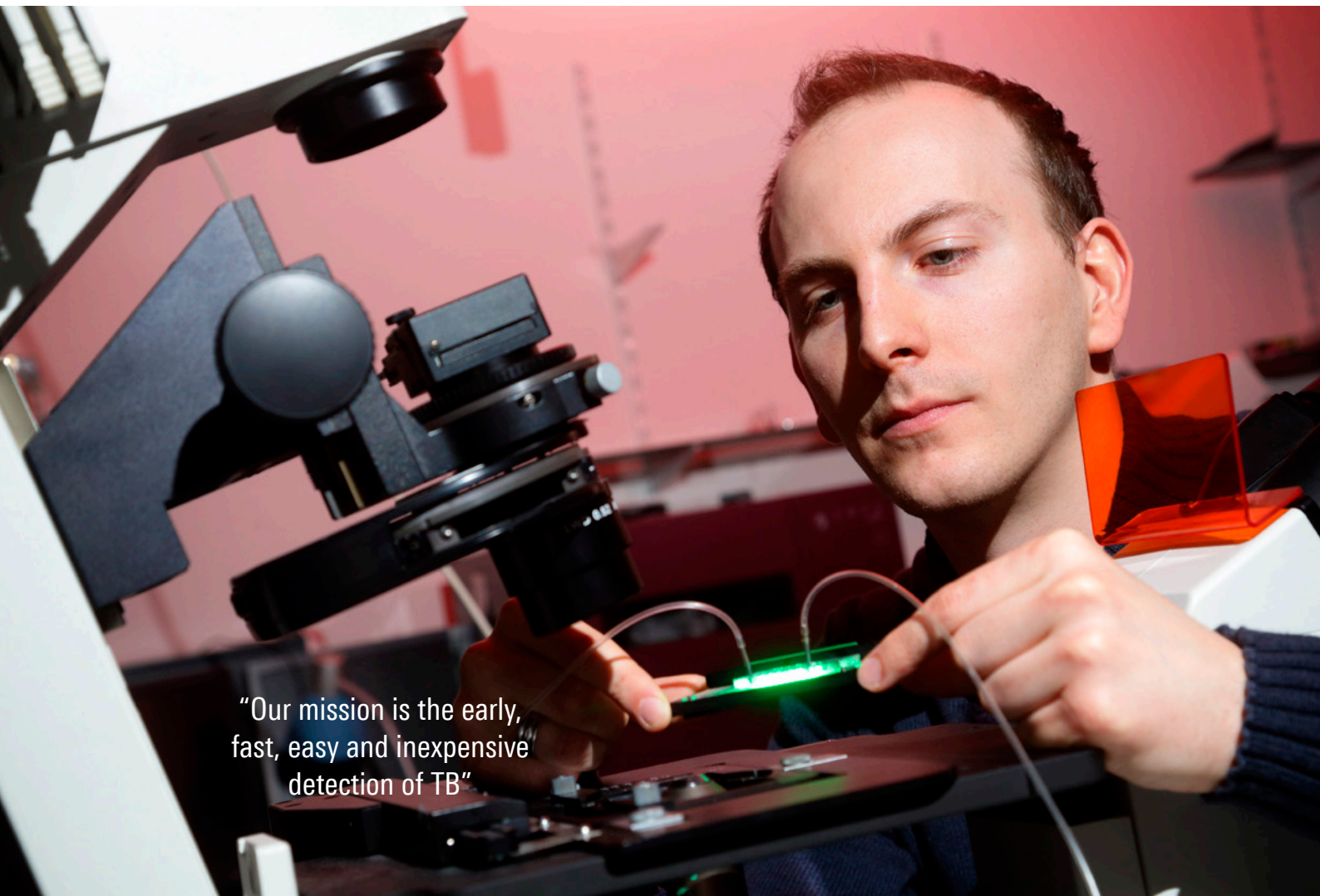
bind to the RNA on the larger particles. When these 80nm and 40nm 'match up', the result is a colour change that can be captured using a colour camera. Bacterial infection can then be ascertained by adding up the number of particles that have changed colour from green to red.

Sensitivity

The efficacy of this quantitative method has already been proved in the lab using synthesized DNA. But Göeken has noticed that RNA does not behave precisely according to the DNA model: 'RNA is a much longer molecule that has a tendency to get tangled up. This makes it trickier to work with than the "trained" synthetic DNA, so our TB sensor is not yet as sensitive as it needs to be to dethrone the gold standard. For our test to be suitable for TB detection, attaining a higher level of sensitivity is crucial. Whereas for the detection of mastitis, price and speed may weigh heavier in the balance.'

Organized

Göeken is therefore looking for ways to improve the sensor's sensitivity. Fellow doctoral candidate Lennart de Vreede is working on a



“Our mission is the early, fast, easy and inexpensive detection of TB”

technique that would make it possible to arrange nanoparticles on a surface in such a way that their number could be increased significantly. ‘You can’t simply increase the concentration’, Göeken explains, ‘because then you’ll end up with particles overlapping and unreliable counts. This new technique enhances the sensitivity and reach of our measurements and is many times cheaper than something like electron beam lithography.’

Cheaper

A second possibility, which Göeken is exploring in collaboration with

Robert Molenaar, is miniaturization of the design. Their aim is to enlarge the applicability and affordability of the design by replacing the standard setup using a microscope, tripod, light source and colour camera with a ‘lab-on-a-chip’. ‘This is a device the size of a smartphone’, Göeken says, ‘complete with a power source, pump, flow cell, camera and LED lights, in which we can insert prepared disposable slides. We started out using white light and a colour camera, but are now conducting tests using coloured LEDs and a monochrome camera, which is quite a bit cheaper.’

Market potential

Though raised in an academic family, Göeken also has entrepreneurial blood running through his veins. ‘I think this design has market potential. Mastitis is a major health problem in the dairy industry and a huge economic drain for farmers. Whereas now you’ve still got to wait several days for the results of a culture, with our test it’s a matter of only a few hours. What’s more, they can do the test themselves. That makes it much faster, and cheaper.’



'This award has evolved into a hallmark of quality and litmus test of success'

VAN DEN KROONENBERG AWARD:
STAMP OF QUALITY FOR YOUNG ENTREPRENEURS

As part of this year's annual Innovation Lecture event, the University of Twente Fund Foundation presented a Van den Kroonenberg Award to the founders and owners of the MoneyBird web app. PHOTOS Gijs van Duwerkerk

MoneyBird is the brainchild of Edwin Vlieg (b. 1986), Joost Diepenmaat (b. 1982) and Berend van Bruijnsvoort (b. 1983). The company produces simple financial software for self-employed professionals and SMEs, with a no-nonsense approach to business applauded by the jury: 'All optionalities revolve around the product. The combination of high-quality software and the user-friendly user interface have won them a devoted following in the Netherlands. This is also expressed in the company culture. They have a team of professionals who know what they are doing and who share the founders' vision, thereby enabling them to make the best decisions.'

Established in 1984, the Van den Kroonenberg Award for young

enterprise is presented to entrepreneurs with demonstrable ties to the University of Twente and who have distinguished themselves in a particular area. The award commemorates the university's former Rector Magnificus, Professor Harry van den Kroonenberg, who passed away in 1996 and was one of the pioneers of the 'enterprising university'. During his tenure as Rector Magnificus, Van den Kroonenberg was highly committed to advancing new business initiatives at the UT. The award consists of a monetary prize of €4,500, a certificate and a trophy created by the former Rector Magnificus' daughter, Mohana van den Kroonenberg.

MoneyBird

Since its launch in October 2008, MoneyBird has built up a clientèle

of more than 100,000 businesses. According to the jury, the secret to its success lies in how it approaches the market. From the outset, the company has worked hand in hand with customers to design the best solutions. Of course, lots of startups do that, but MoneyBird never stopped, and this has given it an edge on the competition. The company's customer focus is also reflected in its plans for the future, which include further automation and making solutions practicable for smaller businesses, too. Solutions such as linking individual business owners and accountants to optimize the administration of accounts.

Vlieg and Diepenmaat, both graduates of the UT (with degrees in Computer Science), remain very involved with the university. In their experience, there's no better time to

start a business than as a student, and to spread this message they take part in various events, give regular guest lectures at the UT and at Saxion University of Applied Sciences, and are active in business clubs that welcome young entrepreneurs.

Stringent criteria

The selection of a winner is a rigorous process. First, the three-member jury draws up a long list in consultation with research institutes at the University of Twente and Kennispark Twente. Further deliberation narrows the list down to three to five startups, to each of which the jury pays a personal visit. The companies are assessed and compared on various aspects, with the jury looking chiefly at the background, structure and vision of each company, their product portfolio, market position, growth of turnover and results, staff, and ties with UT. Based on this information, the jury recommends a winner, who then has to be endorsed by the University Fund.

Because the award is presented to an enterprise that has already proved itself on the market, one of the jury's main criteria is substantive and economic viability. Indeed, most winners spend several years on the short list first. The award is therefore not so much an incentive for new entrepreneurs as a reward for those who have surmounted the initial obstacles and have demonstrated exemplary entrepreneurial capacity as well as growth and continuity. According to the jury, MoneyBird excelled on all these fronts. 'MoneyBird is an innovative enterprise; the founders realized there was an untapped market for new web technologies, built up a stable basis and have developed from there. This has resulted in a healthy, expanding business with healthy margins on sales.'

With its stringent selection criteria, many winners of the Van den Kroonenberg Award have gone on to become leading businesses, making the award something of a hallmark of quality and litmus test of success.

On the trail of former winners

Former winners such as PNO, X-Flow (now Pentair X-Flow), Utopics (now FoTopicus), Fortes Solutions, Demcon, Xsens, Sigmax and Recore Systems are still going strong. Xsens co-owner and 2006 Van den Kroonenberg Award-winner Per Slycke feels the award gave his company an added edge. 'For me and Casper Peeters as entrepreneurs it offered both recognition of what we had accomplished so far and encouragement to continue down that path. It's important for entrepreneurs to have standing in the academic establishment, too, but you don't always get that in Europe.' In 2008 the winner was Fortes Solutions. Owner Sander Nijenhuis recalls the Van den Kroonenberg Award as 'an important milestone' for Fortes. 'It inspired us to embark on a new growth phase.' The company has since even opened a Fortes Lab on campus to collaborate with UT researchers and identify fresh talent.

Gerard Rauwerda was one of the founders of Recore Systems, the company that won the Van den Kroonenberg Award in 2010. Now its chief technology officer, Rauwerda regards the award as a mark of esteem. 'It's wonderful to gain recognition for the fact that you've built up a strong business.' Clearly, winning the Van den Kroonenberg Award puts MoneyBird in good company, with the assurance that the company has a solid foundation and the potential for further growth.

Overview of winners 1984-2015

1984	ir. A. Pelsmaker (Omicron)
1985	ir.Th.A.M. Klijn (Humeca)
1986	G.Meppelink (BTW Besamu-Electronics)
1987	drs. R. Noltes, drs. L. Pieké en drs. J. Schuilenburg (P.N.O.)
1988	ir. Th.G.A. Vink en ir. A.J.P. Jansen (Locamation B.V.)
1989	ir. L. Broens en dr.ir. R.M. Koenhen (X-Flow B.V.)
1990	H.G.M. Silderhuis (Sirex Europe B.V.)
1991	J.J.M.F. Teelen (Teelen B.V.)
1992	ir.A.J.L. Nijsen en ir. A.H.M. Heister (postuum) (First Design)
1993	ir. L.A. Keijzer (PCA B.V.)
1994	drs. L.J.B. Essink en ir. H.M. Romkema (Utopics B.V.)
1995	G. Dijkman, ing. J.W. van der Wal en ir. A.J. de Weerd (Medical Measurement Systems B.V.)
1996	dr. P. Keursten (Kessels & Smit)
1997	ir. S.A. Norden (SPEKAN Engineering B.V.)
1998	ir. F.M. van der Vliet (BBV Software B.V.)
1999	ir. J.L. Andringa (Mecal Applied Mechanics B.V.)
2000	ir. P.B.Y. ten Hoeve en ir. J.J. van Kreij (B-Ware B.V.)
2001	dr.ir. P.T. Rutgers en ir. D.A. Schipper (Demcon Twente B.V.)
2002	dr.ir.E.E. Kunst en dr.ir. N.G.A. van Leerdam (Kunst & Van Leerdam B.V.)
2003	ir. H.T.J. Janssen (INDES Industrial Design & Engineering B.V.)
2004	dr. H.H. van den Vlekkert (Lionix B.V.)
2005	ir. M.C. Mulder en ir. R. van't Oever (Micronit Microfluidics B.V.)
2006	ir. C. Peeters en ir. P.J. Slycke (Xsens Technologies B.V.)
2007	dr. P.J.M. Havinga (Ambient Systems B.V.)
2008	ir. S.W. Nijenhuis (Fortes Solutions B.V.)
2009	ir. L.J. van den Ende, ir. R.J. Morra en W. Rijk (Sigmax Mobile Solutions B.V.)
2010	dr.ir. P.M. Heijsters, dr.ir. L.T. Smit, dr.ir. G.K. Rauwerda (Recore Systems)
2011	dr.ir. G.J. Veldhuis (Nanomi)
2012	G. Hoogendijk BSc, dr.ir. D. Schinkel, dr.ir. C. Mensink (Axiom IC Twente)
2013	dr. D. Theisens (Symbol B.V.)
2014	ir. M.P.A. Woesthuis en drs. K.R. van Eijkelenburg (TRIMM)
2015	Edwin Vlieg MSc, Joost Diepenmaat MSc en Berend van Bruijnsvoort (MoneyBird)



'WE'VE DESIGNED SOMETHING

TECHNICAL MEDICINE: FROM DEGREE TO DISCIPLINE

What began at the University of Twente with two simple words on paper – ‘Technical’ and ‘Medicine’ – has evolved into a fully fledged discipline in the health care sector. Overcoming its initial scepticism, the medical world has now enthusiastically embraced our technical physicians. Programme Director Heleen Miedema was among the programme’s founders. Text **Joost Bruysters** FOTOGRAFIE **Rikkert Harink**

The programme leading to a degree in Technical Medicine was launched in 2003, borne of the idea that emerging technologies in health care are creating a need for professionals who can draw on an in-depth knowledge of both technology and medicine in order to advance patient care. Miedema realized there was a gap in the market. ‘We started out with a concept for which there were no precedents. In other words, we’ve designed something completely new: a new discipline that fits inside the contours and culture of the medical world. It wasn’t about pushing technology; our programme respects the clinical perspective. And that’s precisely why our graduates are so successful.’

Moment of truth

According to Miedema, the real moment of truth was when the first batch of students set out for their internships. ‘Up until then I’d still been able to approach it all from a high level of abstraction, but now we had to prove the real practical value.’ Today, that value has been amply proven by the programme’s students and alumni. Demand for interns has exceeded the supply for years now, and the lion’s share of graduates land a competitive job within just a few months, most in academic hospitals. ‘What started as a degree programme has evolved into a fully fledged discipline within the health care sector’, reflects Miedema.

Success factor

If technical physicians are now received with enthusiasm by the medical establishment, that certainly was not the case when the programme started. One important factor that has led to its success in the face of this scepticism, says Miedema, is the quality of ‘her students’. ‘I have immense respect for them.’ They faced a tough challenge quite simply because there were no role models to look to. ‘When our technical physicians start out at a hospital, they’re supervised by a doctor. Yet those doctors don’t always completely realize that they’re not training a future carbon copy of themselves, but a very different kind of expert with the



COMPLETELY NEW'

skills to harness technologies to meet the needs of individual patients. Our students not only have to listen to the doctor, or to the technician, but first and foremost to themselves. That calls for a deep-seated sense of professional responsibility; instead of obediently carrying out orders, you have to consistently act on your own best judgement. We select candidates on the basis of that inner strength and the desire to continue growing and exploring new directions. In a word: enterprising personalities.'

Own terms

According to Miedema, Akke Bakker exemplifies that enterprising personality: someone who can carve out a position on her own terms. A graduate in the class of 2012, during her internships Bakker noticed that organizations had no real conception of what a technical physician is capable of. 'Initially they tend to group you with the medical interns. But fairly soon it

becomes apparent that you have a great deal more insight into certain complex processes. Because the programme incorporates a wide range of courses, from medicine to computer programming and from physics to communicating with patients, you learn to rapidly change gears and form an opinion on clinical pictures and procedures.' Bakker feels Technical Medicine was a good choice. 'It was a tough programme, but more than anything it was also fun, challenging and varied.' Now a technical physician at the AMC-UvA, Bakker is animated as she describes her work on hyperthermia. 'Heating tumours to a temperature between 41 and 43 degrees Celsius significantly boosts the efficacy of radiation therapy and chemotherapy. My job involves a little bit of everything – around half is spent at the clinic treating patients and the other half involves maintaining the technical systems and researching ways to improve therapies.'

Moving

Now that the first cohort of technical physicians have proved themselves in practice and graduates have received national accreditation to independently treat patients, all the main hurdles have been overcome, says Miedema. Though she remains involved, she no longer has time to attend the graduation speeches. 'Witnessing how students successfully tackle their challenges, work their way to a solution and learn how to carve out a position for themselves is an experience I find deeply moving. You see how they come to grips with problems that

'We select candidates based on inner strength'

you can still remember devising. Or perhaps not devising, but that lightbulb moment is still fresh in your memory. It's brilliant to see how worthwhile it really is and that it works in practice. I still feel very moved by it all, even to this day.'

The long-awaited moment has finally arrived – almost. At the CuriousU office, they're counting down the days. CuriousU is a festival-style summer school happening in August, turning the campus into a supercharged festival site and profiling the best the UT community has to offer from home and abroad.

The bar is high. Text Jochem Vreeman PHOTOS Gijs van Duwerkerk



SUMMER SCHOOL AND FESTIVAL SUPERCHARGE UT CAMPUS

'CuriousU is going to be a brilliant event. It's been a big job for the festival office and for UT as a whole, but beyond that it will be an unforgettable experience for visitors', enthuses project leader Rianne Kaptijn. 'We're all very excited about it.' The 'we' is a group of around sixty people behind the festival's organization, with a good mix of academic and support staff from UT. The groundwork for CuriousU was already laid years ago with the exploration of ideas for a 'summer school festival'. In the wake of the Create the UT of Tomorrow brainstorm event just over a year ago now, those ideas suddenly kicked into high gear.

amount of energy and everyone's increasingly excited to be involved. We've got lots of inspiring course leaders, mostly UT lecturers, professors and PhD candidates, who are responsible for the programme itself. That includes courses about everything from serious gaming to quirky physics classes on things like how to escape quicksand. The Twente factor will be high. Our own research and naturally all the facilities on campus will be a big feature. Am I nervous? Sure I am. This is totally new, we've got zero experience. And of course students also realize it's new. They won't find any photos of previous editions. But that means there's even more of an incentive to really go for it.'

out with a team of six. Now we're often brainstorming with some twenty people, and there are many more involved besides. Everyone realizes how special this event is. A while back I attended a conference in Malaysia about summer schools. Ninety universities from all over the world came to exchange ideas. Everyone was enthusiastic about our plans; there's nothing else like it anywhere. Being targeted specifically at advanced Bachelor's students, we're aiming for a deeper substantive focus.' His colleague and initiator Sander Lotze adds, 'The synthesis of a summer school and a festival has been tricky at times. People ask me what CuriousU is really about. The focus on substance is its most defining feature. Moreover, if you look at it as a summer school, you're getting lots of value for money. Students will have an amazing constellation of experiences, spanning science to music, and, what's more, they'll obtain credits for it. What could be better?'

Among the first people to float the idea for CuriousU was Erik van Dijk at the UT's Strategy & Policy Department. He is delighted about the increasing momentum to pitch in to create a great event. 'We started

'CuriousU is a unique event. There's nothing else like it anywhere.'

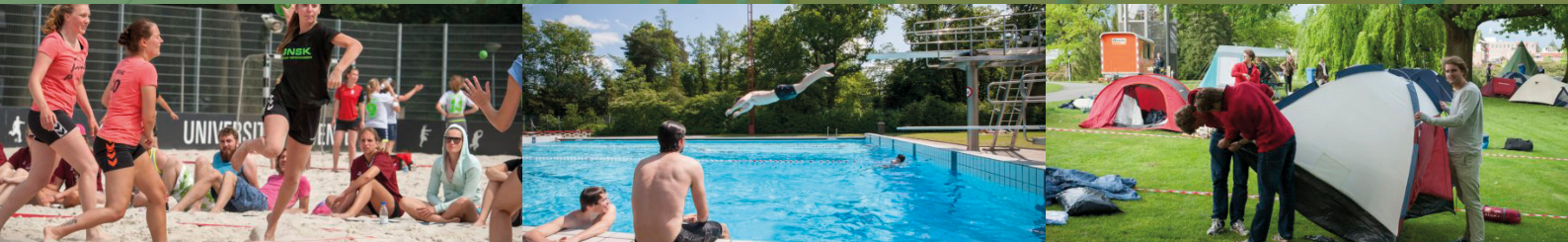
'CuriousU is a unique event. There's nothing else like it anywhere. All the ideas for it come from right here at UT. It has unlocked a huge

SKIPPING FROM TRACK TO TRACK

UT lecturer and PhD candidate Suzanne Janssen, who has been involved in CuriousU from the start, has developed 'A Boost for Health & Happiness', one of the tracks to be offered at the event. 'Basically, it's what it says on the label: it's about figuring out how to keep people both physically and mentally fit. The track focuses on positive psychology and collaborates with other tracks such as Serious Gaming. For example, we might develop a "positive design" app.'

Fellow lecturer Wessel Wits and his team are in charge of the content of another track, 'Design the Future'. Wits sees CuriousU as a unique opportunity to showcase design as a field of study, presented in a way that is also fun. 'This track takes students through every phase of the design

process. One of the interesting facets we consider is design for the bottom of the pyramid. That's about people who don't have access to insurance and monetary systems the way we do, such as in third-world nations. For a long time, it was assumed that if we just sent enough money and goods the problems would simply resolve themselves, but what we actually have to do is stimulate entrepreneurship, the way Queen Máxima has done with microfinancing. One cool aspect of this track is that participants can also instantly print their prototypes using our 3D printers. CuriousU is going to be fantastic. And what's great about it is that students can also skip back and forth between different tracks and pick and choose based on what appeals to them that day. That's unique too.'



UNIVERSITY
OF CURIOUS
PEOPLE.

SUMMER
SCHOOL
FESTIVAL
11-18
AUGUST



CURIOUS
U
20
15
BY UNIVERSITY
OF TWENTE

UNIVERSITY
OF TWENTE.

CURIOUSU PROGRAMME

- Inspirational speakers like Nic Marks (happiness scientist), Ionica Smeets (science journalist) and Bas Lansdorp (Mars One) kick off the day.
- Morning and afternoon tracks are linked to UT research themes such as health, serious gaming, design and entrepreneurship.
- Further features include a beach party, DJs, poetry, 3D printing, business lunches, illusionist Victor Mids and lots more



'ENSCHEDÉ IS A GREAT PAD FOR STARTUPS'

NEELIE KROES (STARTUPDELTA) GIVES UT INNOVATION LECTURE

'Fascinating. Inspiring.' With the TV cameras rolling, Neelie Kroes expressed her enthusiasm for Twente's ecosystem for startups during her work visit to UT in early June. 'A stellar example', praised Kroes, StartupDelta Special Envoy, during her closing UT Innovation Lecture. Her talk centred on the inevitability of change: 'Embracing change means taking risks.' TEXT Hans van Eerden PHOTOS Gijs van Ouwkerk

StartupDelta was established with the mission to transform the Netherlands into one of Europe's largest startup ecosystems. The University of Twente and Kennispark Twente are logical partners in this venture, which provided the impetus for Special Envoy Neelie Kroes to visit Enschede on 2 June. She met with all regional players, from new business owners to investors and administrators. 'Enschede is a great launching pad for startups', Kroes concluded. The problem is that this is not being communicated clearly enough to the world. During the UT Innovation Lecture that marked the end of her visit, Kroes urged, 'If you communicate more clearly about what you have to offer, all that local talent can stay here instead of heading off to Silicon Valley'.

'Embracing change means taking risks.'

Change

'Change' was the crux of Neelie Kroes' lecture, introduced as the 'godmother' of European startups. Change is inevitable, she said, pointing to current social and technological developments, from the ageing population to climate change and from the 'Internet of

things' to robots. But change is also a constant. Recalling the collapse of the Twente textile industry – an industry that spurred regional forces to found our forerunner, the Technische Hogeschool Twente, 55 years ago – Kroes said, 'This is a perfect model for how I think we should handle change'. It resulted in a university at the heart of the region plus 800 booming spinoffs.

Collaboration

Such achievements deserve to be promoted, Kroes emphasized. In her estimation, a willingness to collaborate and to share knowledge, expertise and networks are key regional success factors. She cited the collaboration she witnessed during her visit between the University of Twente and Saxion University of Applied Sciences and myriad parties including public authorities and investors, the 'fascinating' startups themselves, of course, startup hubs abroad, and also in the form of companies that actively support startups, even if it is just to place that crucial first order. Naturally, self-interest plays a role, because it's tough for companies to keep up with the pace of innovation and constantly reinvent their business. 'These startups offer fresh ideas and new inspiration. In short, they bring change. And that makes for a perfect match, all the more when academics are involved.'



LAUNCHING



NEELIE KROES

Neelie Kroes holds a degree in Economics, is a former municipal council member for the People's Party for Freedom and Democracy (VVD) in Rotterdam and became a member of parliament in 1971. This was followed by respective appointments as state secretary and minister for Transport and Public Works (1982-1989). She subsequently served as president of Nyenrode Business University for almost ten years. In 2004 she was appointed European Commissioner for Competition in Brussels, and thereafter as European Commissioner for the Digital Agenda. In late 2015 she became the Special Envoy for StartupDelta.

startupdelta.org

Business angels

Kroes wants to foster this kind of collaboration in the nationwide ecosystem, having seen at first hand in Enschede how valuable this is to the startups themselves. Indeed, collaboration, and not money, is the first requisite cited by young entrepreneurs themselves. 'StartupDelta wasn't established to come along like some Santa Claus to hand out money, on top of all the investors already out there.' Rather, Kroes is working to engage all interested parties, from institutions to the tax service, in order to find ways to boost the investment climate. Venture capitalists play particularly a critical role, and she is also calling on private investors to consider becoming business angels for startups. 'I've already seen successful examples of this, but there is still so much more that could be done. We have to shed the tendency towards risk avoidance that's so entrenched in the Dutch mindset. After all, embracing change means taking risks.'

Inspiration

Risk appetite is one thing Neelie Kroes has certainly demonstrated over her long career. So it came as no surprise when she accepted Prime Minister Mark Rutte and Economic Affairs Minister Henk Kamp's proposal at the end of last year to take on the task of galvanizing the Dutch startup ecosystem. Her visit to Twente certainly provided Kroes with plenty of inspiration.

AMERICAN INVESTOR DISCOVERS TWENTE 'FERRARI'

During her UT Innovation Lecture, Neelie Kroes lauded the alliance that UT and Kennispark Twente forged with American investment company Cottonwood Technology Fund last year, calling it 'an excellent move'. Cottonwood has already invested 1.6 million euros in UT spinoff Clear Flight Solutions, developer of robotic birds, and more investments are in the pipeline, according to Ray Quintana, lead partner at Cottonwood Euro Technology Fund, who was also in the spotlight on 2 June. 'With all the opportunities here, we've barely had a chance to look beyond Enschede.' He was also full of praise for Twente's startup ecosystem. 'Everyone looks to Silicon Valley, but that's just the tip of the iceberg. There's also a lot happening "underwater", such as here in Twente. People have managed to create their own Ferrari here. All we have to do is get in and then it's full throttle ahead!'

cottonwoodtechnologyfund.com

A LOOK IN THE LAB

Name **Fieke Hillerström**
Age **22**
Position **Electrical engineer on
Solar Team Twente**
Degree **Electrical Engineering**
Lab **Enschede Airport Twente
Workshop**

TEXT **Jochem Vreeman** PHOTOS **Gijs van Ouwerkerk**

That there are few aircraft left in the hangars at Enschede Airport Twente is nothing new, but one of them has recently been repurposed for a very special project. Inside hangar 10A Solar Team Twente is building a new solar car.

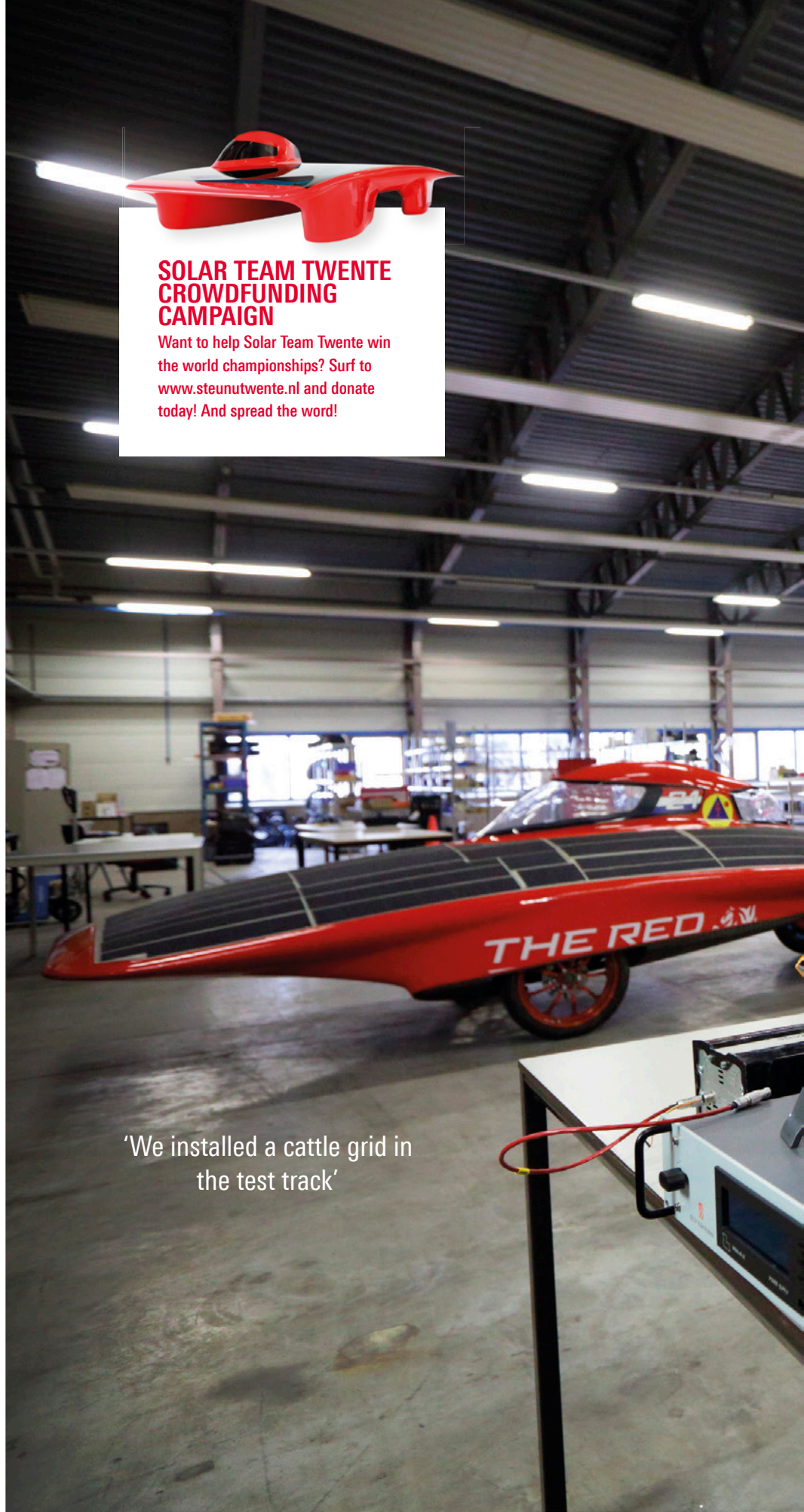
'I often forget the time and don't realize how late it is till I hear it on the radio at the end of the afternoon. Building a solar car is pretty absorbing', explains Fieke Hillerström. 'Here in the workshop, we're all really able to focus.' Fieke has just spent hours concentrated on tiny electronic parts, power supplies and programming languages. For her, the real work began after the team unveiled its design for a new solar-powered car in March. She and the other team members spend a lot of time in the workshop testing all the individual parts, from wheels to brakes and from the steering system to the rims.

Compared to their previous workshop at Thales, the hangar has lots of added advantages. A wealth of space, for one thing. The old solar cars are all on display and the mockup of the new model is ready on the floor. Large wooden blocks support the carbon mould used to make the body of the new car. 'But above all, the location is ideal', says Fieke. 'We can drive out of the hangar straight onto the test track. We adapted a few aspects of the track first, like installing a cattle grid. We encountered quite a lot of those in Australia, so then it's useful to know how the car will respond.'



SOLAR TEAM TWENTE CROWDFUNDING CAMPAIGN

Want to help Solar Team Twente win the world championships? Surf to www.steunutwente.nl and donate today! And spread the word!



'We installed a cattle grid in the test track'



The course of Yori Kamphuis' life has been defined by physical setbacks. In a good way. He now wants to use his personal experiences and his company Coblue Cybersecurity to make the world a better place. 'I never give up. I just keep pressing on until whatever it is works.' TEXT **Marco Krijnsen** PHOTOS **Rikkert Harink**

GO-GETTER AND

'If you accept a situation, then you won't be able to change it'

STORRO TO BLOCK CYBER ATTACKS

Coblue Cybersecurity was founded in 2008 by three students: Yori Kamphuis, Remco Bloemen (both from the University of Twente) and Michel Eppink (Saxion University of Applied Sciences). Initially called Qubis, four years later the company was hailed by the Kairos Society as one of the fifty most innovative university startups worldwide.

Coblue Cybersecurity is based at the Thales High Tech Systems Park in Hengelo and specializes in technologies designed to enhance IT security within organizations. Currently it is working on a government assignment to create a platform for the secure storage and sharing of files. This system, Storro, is due to become available this autumn. What distinguishes Storro is that it offers peer-to-peer transfers with a high level of file encryption, making cyber attacks (DDoS) impossible. Users can also easily access all previous document versions, complete with track changes.

YORI KAMPHUIS (b. 1985) studied Industrial Engineering and Management at the University of Twente (2005-2010) before going on to obtain a Master's degree in Geopolitics, Territory and Security from the renowned King's College London. He subsequently received a grant to study at the Singularity University in Silicon Valley. Kamphuis has won various business contests, including the NATO Cyber Defence and the StrIcTly for Business competitions. In 2013 he was named Futurist of the Year.

DO-GOODER



IDEALISM AND HIP PROBLEMS INSPIRED COBLUE CYBERSECURITY

What would have happened if Yori Kamphuis had remained in good health? We'll never know. But there can be no doubt that he has been shaped by the countless hours he has spent in hospital. That he would end up choosing a job in IT was clear fairly early on. At the age of ten, Kamphuis had already built his first computer, and going into secondary school he was in business selling network cables. Yet around the same time his life became increasingly constricted by hip problems. Plagued by a congenital hip defect, Kamphuis had to undergo eight hip operations. 'Each time I had to stay in bed or in a wheelchair or walk on crutches for four to six months. You want some form of diversion, and at a certain point, TV gets really old. So you start to think up things yourself. I was fascinated by hardware. That's something I was able to spend a massive amount of time on in that period', he says. Yet for Kamphuis it was never a nerdy preoccupation with technology for its own sake. It had to be relevant. It had to be about people: 'I grew up in a family with two brothers and lots of foster kids – 23 foster brothers and sisters altogether. There were always around ten of us at the dinner table. That defines you. For me it's second

nature to do things for other people, and I've always wanted to use technology to help others.'

Finland and Twente

After secondary school, Kamphuis enrolled in Industrial Engineering and Management at the University of Twente, a broad programme that suited his enterprising spirit. The decision to study in Enschede was prompted by his experiences during a year abroad in Finland during secondary school. He had spent a whole year surrounded by nature and wilderness, and wanted to keep that feeling alive on the Twente campus. 'When I first came to take a look, I instantly felt at home here.' Of course, Industrial Engineering and Management alone was not enough to sate Kamphuis' voracious appetite. He also became a member of the AIESEC Twente international student organization, which arranged a study trip to Kenya in 2007. It was a trip that was to turn his life upside down, literally and figuratively. While out one day, a bus crashed into the car he was sitting in, sending him flying head first through the windscreen. He had to be resuscitated and was left with a collapsed lung and his jaw, both eye sockets and six ribs broken.



With team members Eljo Haspels and Martijn van Anandel in Paris during the E-strat Challenge finals.

PARTY IN THE EIFFEL TOWER

Kamphuis has been blazing quite a trail since his days as an Industrial Engineering and Management student at the University of Twente, and has fond memories of the university's Honours Programme. 'For me, it was more than just an education'. I still see the friends I made back then regularly, and one of them, Remco Bloemen, is the co-founder of Coblu Cybersecurity. It was fun and interesting to work alongside students from other programmes like mathematics and psychology to explore a diverse range of subjects, and that same multidisciplinary approach is also crucial at a company like Coblu. What the Honours Programme also taught me was how to write good essay. Those writing skills played a big part in being chosen Futurist of the Year.'

Kamphuis is also a co-founder of Ockham, the association for Honours Programme students, and he still meets with lecturers from time to time to discuss new features of UT's Honours Programme and of ATLAS University College. During his studies, Kamphuis worked as a project manager at the UniPartners Twente academic consultancy, where he won the Dutch qualifying round of the E-strat Challenge in a team with colleague Eljo Haspels and Martijn van Anandel, who Kamphuis met at the Campus Coalition. The finals in Paris, says Kamphuis, were 'unforgettable'. 'They'd organized a party on the first floor of the Eiffel Tower. It was amazing!'

'What happened in Kenya left me permanently brain-damaged. The doctors said I wouldn't be able to complete my studies – at most I might be able to spend an hour a week studying in two years' time. I had speech difficulties and at first people around me found it almost impossible to understand what I was saying. But in the end I managed to recover faster than expected. How? Mostly through a positive mindset and perseverance. After six months I returned to school, obtaining a 2 and a 3 for my mathematics courses. In the resits I got a 3 and a 4. The lecturer suggested that perhaps I should quit the programme, but I didn't see it that way. That 3 represented a fifty per cent improvement: if I could keep that up, I'd be able to succeed. And I did, after seven tries, and then I passed by an ample margin.'

Quick to tire

Nonetheless, the car accident has had lasting repercussions. There are physical limitations, such as being quicker to tire. And he has all but lost the ability to play from sheet music. Mentally, however, Kamphuis is stronger than ever before. 'I've gained a different sense about the notion of the impossible. Now, when people say they "can't" do something, I wonder to what extent they've genuinely tried. If you accept a situation the way it is, then you won't be able to change it. That became a mantra while I was in rehabilitation, and it's still the ethos that guides everything I do. To be able to solve a problem or develop a technological innovation, you have to press on and not be quick to give up.'

His desire to make the world a better place has only grown since Kenya, knowing how lucky he himself was there. Had he not happened to end up at a good hospital, he would not have survived. In other words: poor Kenyans have a lower hope of survival than rich Westerners.

Innovation Lecture featuring Kamphuis and Kroes: a recap

On 2 June, Yori Kamphuis gave an introductory talk as part of the UT's annual Innovation Lecture. Neelie Kroes, former EU Commissioner and now Special Envoy for StartupDelta, was the event's main speaker. Not long ago, Kroes dedicated a blog post to Kamphuis, and since then the two have been in regular contact.

The second introductory speaker on 2 June was Ray Quintana, general partner at the Cottonwood Technology Fund, which opened its European headquarters in Twente last year.

Hosting the Innovation Lecture was entrepreneur and author Jim Stolze, the brain behind the TEDx conferences in Europe and the Middle East.

Technology can help to redress this inequality, and to solve many other global problems besides. Since his experiences in Kenya, this conviction has become a motivating factor in many of Kamphuis' activities. In his role as one of the 4,000 Global Shapers at the World Economic Forum in Davos, for example, and in co-founding Coblu Cybersecurity, a business that works to make the world a safer – and thus a better – place.

'We're becoming ever more reliant on technology, so good management of that technology is essential. Just imagine if someone could hack your pacemaker. Coblu helps organizations to arm themselves against cyber threats. Lots of companies have information that others, like their competitors, would love to get their hands on. You've got to make sure those data are protected. For example, there was a Brazilian firm that wanted to make an offer on a large oil-field a while back, but they lost the tender to an American competitor because that company had gained access to NSA information about the Brazilian firm. So many people wrongly assume that they have nothing to hide. My response to that is: OK, can I have your bank login details?'

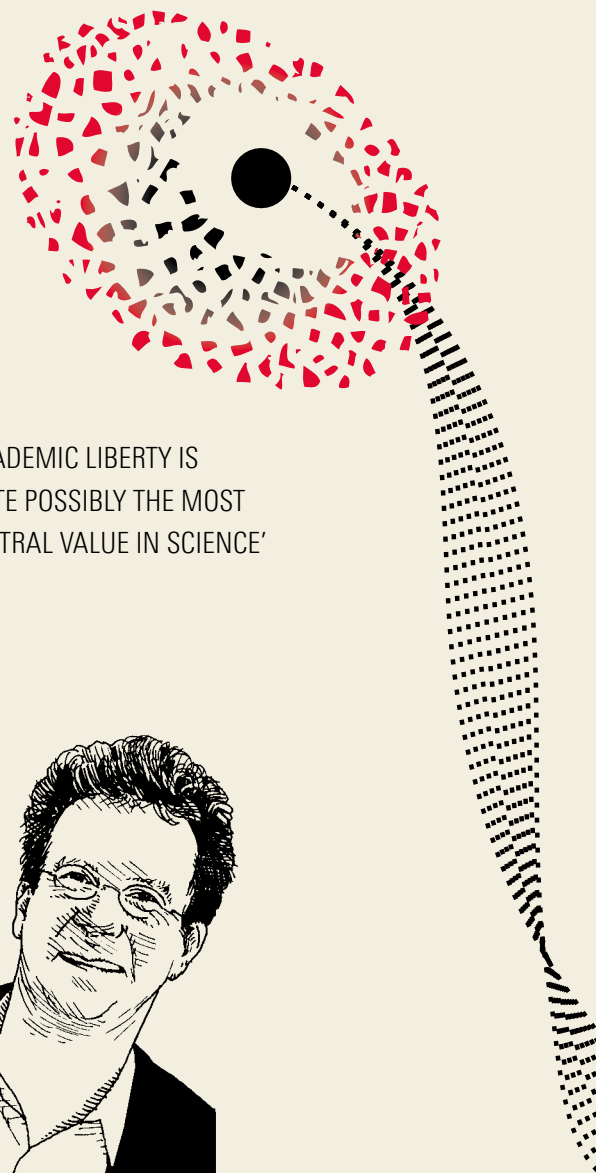
LIBERTY AND COMPETITION IN SCIENCE

These are turbulent times in academia. For the first time in decades, students once again occupied the University of Amsterdam's Maagdenhuis building, hunkering down for weeks in a fervent protest against extremes of economic thinking in science, and thereby galvanizing a long overdue debate. Even so, I have some reservations. It would be a real shame if attacks on the output mentality were to send us sentimentally retracing our steps back into the past. For however extreme it may be, that output mentality started out as a committed response to the dark side of events that began in the Maagdenhuis fifty years ago.

In those days, there was no lack of funding for research. Every university staff member could count on spending at least forty per cent of their time on research activities. The loss of this luxury has been a major catalyst, forcing scientists and scholars to provide a raft of evidence to have any hope of receiving funds. The only problem is that the balance has now begun to tip too far. People are beginning to spend a disproportionate amount of their time drafting proposals that have only a slim chance of success. And the prevailing output mentality is becoming a bit too profit-based, to the extent that economic benefit is turning into the criterion for scientific funding. The main question we should now be asking, therefore, is: How can we use the legacy of neoliberalism to work for us rather than against us?

It comes down to reshaping two core values in neoliberalist thought: 'liberty' and 'competition'. To begin with the latter, competition only serves a purpose when the conditions in which it is exercised are fair and it ensures that scarce resources end up where they will be most effective. Competition does not work if it leads to a ubiquitous contest in which it is past winners who have the best guarantees for the future.

Academic liberty, in turn, is quite possibly the most central value in science. Yet, to paraphrase Isaiah Berlin, that liberty ought to be conceived in terms not of 'negative liberty' but of 'positive liberty'. Negative liberty is the liberty that comes when obstacles are removed; it informs the neoliberalist premise that science is free to explore where it will, as long as it can stand on its own feet. Positive liberty is the freedom to do something: a positive action directed towards a goal. And this is precisely the question the scientific community has to answer: For what purpose do we want academic liberty? Liberty for its own sake is too *laissez faire*; that would put us back at square one, with scientists holding out their hands and assuming that taxpayers will simply foot the bill. Positive liberty is a committed liberty. It is a science that reckons itself a part of society and that wishes to contribute to in its turn. It is a science driven by curiosity and by social awareness. Now that would be a truly worthwhile legacy of the 1960s. ●

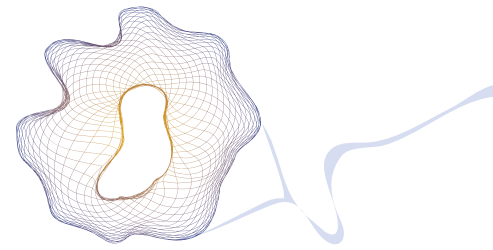


'ACADEMIC LIBERTY IS
QUITE POSSIBLY THE MOST
CENTRAL VALUE IN SCIENCE'



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

IN BRIEF



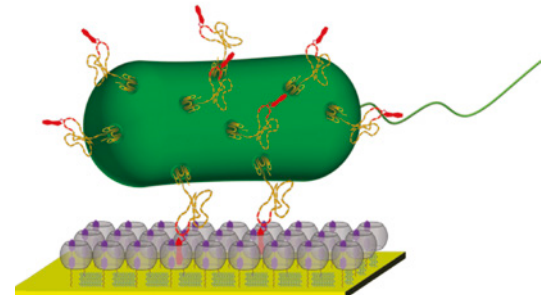
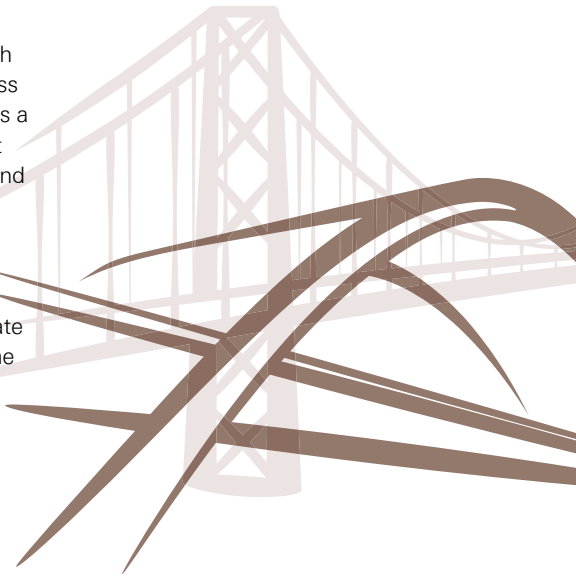
SELFIE

Students from the University of Twente have made an attempt to beat the world record for a selfie with the largest number of recognizable faces. The current record-holder is Microsoft, with a selfie featuring 1,151 recognizable faces. The record attempt was an entertaining tangent to Create Tomorrow, the largest student think tank worldwide. During this biennial event, student groups tackled real-world business cases.



CABLELESS BRIDGES

Researchers at UT's CTIT research institute have developed a wireless sensor network system that offers a much cheaper and more efficient way to inspect bridges, tunnels and buildings. Installed during construction, the system does active duty for the entire lifespan of built structures and removes the need for builders to incorporate many thousands of cables into the framework. As well as vibrations, inclines and tension in the framework, the sensors also measure the stability of the foundation. Depending on the structure, the system can be comprised of anywhere from a few dozen to thousands of small sensors.



ONLINE BRAINWASHING

A smartphone game that helps players beat an addiction? That's the idea behind Breindebaas ('brain boss'), a new app being developed by Marloes Postel at the University of Twente. The app is based on a computer module that trains the brain to break ingrained patterns of thought. 'Online brainwashing to a good end', Postel calls it. The app is intended to make addiction treatment more accessible to a larger group of people by removing a threshold that stops many addicts from seeking therapy.



LIVING IMPLANTS

Researchers at UT have come up with a method for the natural incorporation of living cells into materials, with preservation of all properties. They have already succeeded in modifying bacteria in such a way that they can be incorporated into man-made materials using dynamic weak bonds. The new method opens the way for 'living implants', such as stents to which cells from blood vessel linings can attach.

MH17

Scientists at the University of Twente are evaluating the Dutch national crisis management organization's response to the Flight MH17 tragedy, in a study commissioned by the Ministry of Security and Justice's Research and Documentation Centre (WODC). The aim of the evaluation is to examine the performance of the Dutch national crisis management organization following the crash of the aircraft,

to what extent this performance served to manage the crisis and the manner in which the national government communicated with and informed the victims' next of kin, the public, parliament and the media. René Torenvlied, professor of Public Management, is leading the project and has assembled a multidisciplinary research team of experts from UT's Institute for Innovation and Governance Studies (IGS).



WATER TRANSPARENCY

All around the world, the risks of high water consumption are increasingly being recognized. Yet corporate openness about water consumption is still very limited, as revealed by a ranking compiled by Water professor Arjen Hoekstra, which scores the 75 largest listed companies in the Netherlands on their transparency regarding water consumption. As many as 34 of the 75 companies even scored 0 per cent. Hoekstra notes that companies are becoming increasingly cognizant of water issues. The Heineken beer brewing concern came in at the top of the ranking.



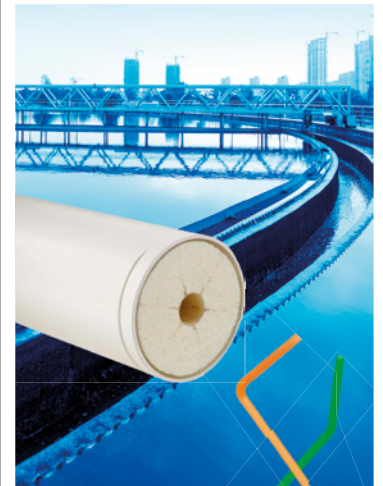
EUROPEAN GRANT

UT professor Albert van den Berg has been awarded his second ERC Advanced Grant from the European Union. A prestigious honour, it is unusual for this grant to be awarded to the same person twice. Van den Berg has been allocated 2.25 million euros in research funding to cultivate blood vessels on a chip. Made from 'reprogrammed' human stem cells, the blood vessels will be used in research into the occurrence of thrombosis and neurological diseases such as Alzheimer's and MS. Van den Berg's research ties in seamlessly with the aims of the hDMT (Institute for human Organ and Disease Model technology), a large research consortium forged to make the Netherlands a global leader in organ-on-a-chip technology.

The University of Twente has been very successful in the most recent round of European research funding grants. Another recipient was UT researcher Sonia García Blanco, who was awarded a two million euro ERC Consolidator Grant to finance the development of low cost, compact, tunable lasers and frequency combs that can operate at frequency ranges not easily achieved with current technology.

STRAW MEMBRANE

New selective membranes in the form of thin hollow straws can improve water purification. The membranes, co-developed by Joris de Groot at UT's MESA+ research institute, make it possible to purify water in a single process step, eliminating the preliminary treatment now still required at water treatment plants. The most important benefits of the new membranes are that they can make the provision of drinking water easier and therefore cheaper, and can improve the removal of micropollutants such as pharmaceutical residues.



You can find more information about these stories on our new website at www.utwente.nl.

INVITE AN INTERNATIONAL STUDENT TO DINNER!

We're looking for enthusiastic alumni who would like to host a dinner for new international students and their Dutch UT buddy. This is part of the Buddy project organized by the Student Union, in which experienced Dutch UT students are paired up with new international students. The Dutch students have volunteered to be buddies to our international students as they explore the Netherlands, Enschede and of course UT!

We are eager to introduce these international students into our alumni network, and a dinner offers the perfect opportunity for them to get better acquainted with the local culture, daily life in Enschede and our alumni.

As an alumni host, you can choose a date and a time during the last week of September (week 39) and the number of students you would like to invite (two or three; some Dutch students have more than one international buddy). If you are interested and would like to find out more, please send an email to alumni@utwente.nl.



MEMORIES OF MY UT PROFESSOR

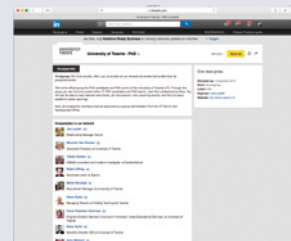
It is characteristic of UT that many students continue to stay in touch with their professors – even long after graduating.

Alumnus Ben Burgers (EL '83) is one such student. On 20 January 2015 his former instructor, Professor Emeritus Willem Gröneveld (PG for short) passed away at the age of 88. Ben was keen to share his special memories of this professor with fellow alumni.

'At my first real meeting with PG as a Master's student of Electrical Engineering, my impression of him was as strict, but fair. I had an exam in this one course, Statistic Detection and Measurement Theory, that involved writing a paper on a question that had been circulating among students for years. You had to hand it in and then give an oral explanation. No big deal, right? Wrong! My paper was a wasted effort; it never even came up. After speaking for 15 minutes, PG's verdict was that I just barely rated a 7. I was fine with that, considering the course was notoriously difficult and one everyone tried to avoid. But, according to PG, if I wanted him to supervise my thesis, I would have to know it backwards and forwards. Riding my rattling moped back to my job at what used to be Holland Signaal I raged into the wind. I had to start again from scratch! And I was up to my ears already!

A few months later I was seated across from the serious, serene professor once again. Tense, but not really worried. I was pretty sure that I now had a firm grasp of the subject. After a few minutes and a couple of questions, I was released: I'd proven that I had mastered material. In the end I got a 9, I believe. And I was happy. I hadn't merely passed an exam, I had gained valuable insight into the subject. I had conquered this course, the universal foundation of detection and measurement theory. PG shared my elation. From that moment, I understood the meaning of in-depth scientific analysis. Better late than never! PG has been a role model to me ever since, both as a teacher and as a person.

Afterwards, when my moped wouldn't start, I just patiently and lovingly wheeled it to the repair shop.'



MORE THAN 4,000 UT PHD ALUMNI

Around six months ago the Alumni Office began a project to compile the names of all PhD graduates of the University of Twente. Since the first PhD was conferred on Marina van Damme in 1965, more than 4,000 students have followed in her footsteps. The Alumni Office was able to track down around 2,500 contact details via LinkedIn and has now created a dedicated LinkedIn group for all UT PhD graduates, with 700 members and counting. Are you a UT doctoral alum, and would you like to join the group? Surf to www.utwente.nl/linkedin-phd and sign up! Other alumni can also keep in touch with UT via social media. Join 13,000 other alumni in the general University of Twente LinkedIn group or like our University of Twente Alumni page on Facebook. And visit www.utwente.nl/alumni to see how you can stay involved!

UT ALUMNI MAGAZINE REACHES 23,000 ALUMNI

Circulated to 82 per cent of all UT alumni, the UT alumni magazine is read by as many as 23,000 people, according to a survey conducted by Newcom on behalf of the University of Twente. The survey was held among a representative sample of alumni and partners, with a response in excess of 1,000 completed questionnaires. Aimed at gaining insight into alumni and partner expectations of the university, UT hopes to use the survey findings to maximize the relevance and interest of the information it provides. As the findings reveal, the magazine is the main source of information for alumni, with 82 per cent of respondents having perused the magazine. Other relevant communication channels cited aside from the magazine were the alumni newsletter, the UT website, LinkedIn and the Alumni Portal.



UTALUMNI ON THE MOVE

- In December 2014 **Eline van den Hombergh-Vink, CiT '06**, was appointed systems engineering consultant at 2ndSense bv. Previously she was a systems development advisor at the Directorate-General for Public Works and Water Management (Rijkswaterstaat).
- As of January 2015 **Maarten Büchli, EL '00**, is the network planning director for Europe, the Middle East and Africa at Microsoft. Before this he worked at Google for three years as a technical program manager in charge of Network Planning and Acquisition.
- **Katarzyna Wac, TEL '04**, was named associate professor at the University of Copenhagen's Department of Computer Science and the Human-Centered Computing Section with effect from January 2015. Before this she taught at the University of Geneva for more than four years and at the Stanford and Carnegie Mellon universities in the United States.
- As of January 2015 **Frauke Logermann, ES '14**, is the EU project advisor and consultant for the Max Planck Society in Germany (Bavaria Cluster).
- **Ravindra Tupe, TN '06**, was appointed lead scientist at SABIC in Bangalore, India, as from January 2015. He previously worked as a senior research engineer at Borealis in Finland.
- In January 2015 **Martijn Leenhouts, TBK '02**, started as implementation leader at McKinsey & Company in Dubai in the United Arab Emirates. Prior to this he also worked in Dubai, as a senior manager at the Peppers & Rogers Group.
- **Erik Veldhuizen, TBK '91**, has been director of commercial excellence at AkzoNobel Decorative Coatings since January 2012. Before this he held various posts at Diversey/Sealed Air.
- **Thijs Muizelaar, CiT '03**, started working as a senior advisor at Connecting Mobility in Utrecht in February 2015. He previously worked for the City of Amsterdam as a senior traffic management advisor, and at Capgemini as a project leader and business analyst.
- As of February 2015 **Mischa Strating Veth, TCW '04**, was appointed Learning and Development Manager at Boskalis. Previously she was an advisor and project manager at MSLGROUP.
- In February 2015 **Peter Slagt, WB '90**, joined Bain & Company in London as a partner. He had been with McKinsey since 1993, first as a consultant, and from 2000 as a partner.
- **Jan Willem van Wijck, TBK '89**, was appointed global procurement leader at Novartis in Basel, Switzerland as from February 2015. He has held various positions within the Swiss pharmaceuticals company since July 2008, and before that at Unilever and Medtronic, amongst others.
- In March 2015 **Thomas Weichert, ES '10**, began working as a policy officer at the Federal Office for Migration and Refugees in Essen, Germany. He previously was an intern at the European Advisory Group.
- As of April 2015 **Marcel Lucassen, TN '88**, is a senior scientist at Philips Research. Prior to this he worked as a freelance consultant and owner of Lucassen Colour Research for more than eight years and, before that, at the University of Amsterdam, TNO and AkzoNobel Coatings, amongst others.
- **Andre Hendriksen, TW '91**, started working as senior manager of quality at Stryker in Freiburg, Germany, in April 2015. Former employers include Testo AG and GE Energy.
- **Erik Fledderus, TW '93 and PhD EWI '97**, was appointed managing director of Surf, the collaborative ICT service provider for Dutch higher education and research, in May 2015. Up until September 2014 he was the managing director of Information Society at TNO, and thereafter principal ICT scientist.
- As of May 2015 **Han Horlings, BIT '07**, has been business analysis and reporting manager at APM Terminals. Before this he worked as a consultant at KPMG for ten years.

Read all the latest personal updates on twitter.com/alumniUTwente.

Got a new job? Or know of someone whose accomplishment deserves mention? Send us your tips at alumni@utwente.nl

COLOFON ALUMNI NIEUWS

Questions or suggestions?
alumni@utwente.nl
 Telephone (053) 489 2104
 Twitter: @alumniUTwente

Alumni Office
www.utwente.nl/alumni
 Changes of address
 Subscribe or unsubscribe
 digital newsletter
 Email forwarding request

SAVE THE DATE!
 ALUMNI DAY 2016:
 17 SEPTEMBER



THANK YOU TO OUR DONORS!

In recent months UT and the University Fund have stepped up fundraising efforts in order to amass the additional resources needed to help the university excel! And you have shown your commitment by rewarding our efforts. Elsewhere in this magazine you can read about some of the results of our fundraising campaigns, including our Make the Difference annual drive, the www.steuntutwente.nl crowdfunding platform, the MIRA dinner at Het Loo Palace to raise money for an injectable plaster for osteoarthritis, and Bata4Life to benefit cancer research. We would like to extend our sincerest thanks to everyone who contributed to the success of these campaigns, including the donors, organizations and their employees. Our gratitude also goes to all the alumni and partners who expressed their commitment to the University of Twente in the form of large donations and bequests to support UT researchers and student activities. Thank you once again for your generosity, and we hope that you will continue to think of us, both now and in the future!

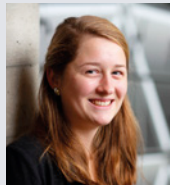
YOU MADE THE DIFFERENCE: THANK YOU!

In December 2014, UT alumni, partners and staff received a call for donations to the University Fund's Make the Difference campaign. The campaign was dedicated to four special university projects that have been made possible through the generous support of alumni, partners and staff. All together, the December mailing, an April reminder and the new crowdfunding platform resulted in more than 300 new donors, alongside additional gifts from many existing benefactors. In total, the new donors helped us to raise over €25,000 – a brilliant result! These funds are enabling Marcel Karperien to accelerate trials with his injectable plaster, the Green Team Twente to purchase better parts for their hydrogen-powered car, Science on Tour to hit the road more often and buy more experiments, and ATLAS Twente University College to offer an additional student scholarship. Our deepest gratitude to all donors for their generous support: you are making the difference!

SCIENCE ON TOUR
€ 3,295



GREEN TEAM TWENTE
€ 3,259



ATLAS UF GRANT
€ 1,385

INJECTABLE PLASTER
€ 6,075

NO DESIGNATION
€ 12,087

TOTAL
€ 26,101

For those who still want to help make a difference: it's not too late! Please visit www.steuntutwente.nl. Your full contribution will go to the project of your choice. Donations made without a project designation will be distributed amongst all four projects. Thank you!

INTER-ACTIEF STUDY TRIP

Last November, 27 members of the Inter-Actief association for students studying Computer Science and Business and IT went on a group trip to the United States and Brazil. Totalling 24 days, the USB 14.0 (United States and Brazil, November 2014) study trip visited companies such as Google, Yahoo and Dropbox and universities including Stanford and Berkeley, alongside plenty of cultural excursions. The aim of the trip was to identify and experience cultural similarities and differences at the businesses and universities visited in Brazil, America and Europe, and to draw lessons from these new insights. The students returned home

feeling that the world was their oyster! The trip was made possible in part by the Twente University Fund and our many donors. You can read more about the study trip on our website: www.inter-actief.utwente.nl/studiereis/usb14/.

This year the University Fund is once again extending grants to fund various study trips for nearly 100 student association members, including members of Alembic to go to South Africa, Isaac Newton to India and Singapore, Arago to South Korea, China, Shanghai and Hong Kong, and Astatine to Japan. We wish them all a fun and educational experience!



bata4life

RECORD PROCEEDS FOR BATA4LIFE!

Bata4life has raised almost €13,000 this year to benefit the Dutch Cancer Society. This is €3,000 more than previous record of just under €10,000 from 2013. All runners and teams that took part in the Batavierenrace – the world's largest relay race, stretching from Nijmegen to the campus of the University of Twente – could seek sponsors. Crossing the finish line with the highest amount was the NOVA student association from Delft, with almost €3,000, while Bata sponsor Topicus' 'Poison Frogs' team collected €2,000. The event also included auctions and parties with proceeds to benefit Bata4life. The money raised by the campaign will support scientific research on cancer.





PLEDGE OF 100 VAN DAMME GRANTS

The 13th Marina van Damme Grant presentation at the University of Twente this year was memorable for several reasons. Not only did it mark the 30th grant awarded by Dr van Damme (in addition to grants for UT alumnae, she also provides grants to alumnae of Eindhoven and Delft universities of technology), but Executive Board President Victor van der Chijs also had the honour of announcing that the grant will continue to be guaranteed over the years ahead, with the 100th Marina van Damme Grant to be presented in 2038. Dr van Damme was given a special thank you on behalf of the three universities of technology and their university funds for her generous pledge.

ITC ALUMNA DANG ANH NGUYET WINS MARINA VAN DAMME GRANT

In a ceremony during the Innovation Lecture on 2 June, the board of the Twente University Fund awarded the 2015 Marina van Damme Grant, intended to help high-achieving UT alumnae accelerate their careers, to Dang Anh Nguyet. Jury member Helga Zevenbergen, owner and director of SES Creative and Twente Business Woman of the Year 2014 presented the award.

In her application, Dang Anh (born in Vietnam in 1988; MSc in Geo-information Science and Earth Observation from the ITC in 2012; currently employed at the Asian Institute of Technology in Thailand) explained that the Marina van Damme Grant will be vital in advancing her research into the impact of changing soil use in the Cuu Long River Delta ecosystem in Vietnam. Her aim is to apply the Land Utilisation & Capability Indicator, or LUCI framework (developed in New Zealand and already employed successfully in many regions worldwide) in this part of Southeast Asia. The LUCI framework can help local government officials make informed decisions regarding land use and thus address issues such as erosion, soil depletion, flooding and the preservation of biodiversity, water quality and, crucially, agricultural productivity. The jury was particularly impressed with Dang Anh's ambition to develop a training programme to transfer the knowledge she acquires, which ties in closely with the University of Twente's own dedication to knowledge valorization. The University Fund hopes that Dang Anh will play a pioneering role as the first Van Damme winner from Southeast

Asia, inspiring many girls and young women in developing countries, and her native Vietnam in particular, for whom pursuing a career is not an obvious choice.

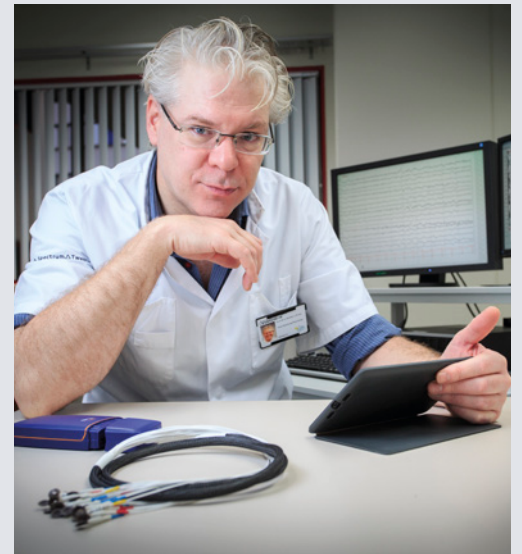
The Marina van Damme Grant is made possible by a Designated Fund in the name of Dr Marina van Damme, who became the first woman to obtain a doctorate in Engineering at the UT's forerunner, the Technische Hogeschool Twente, in June 1965.

BEQUEST FROM THE LATE PROF. E.W. GRÖNEVELD

The Twente community was saddened by the loss of Professor Willem Gröneveld in January. Willem Gröneveld had been part of what began as the Technische Hogeschool Twente from its foundation, appointed professor of Network Theory, Information Theory, Communication Theory and System Theory (a core subject area within Electrical Engineering) in 1964. A strong analyst with a critical scientific mindset, Gröneveld helped to shape Electrical Engineering in Twente. He retired in 1988. A loyal benefactor of the University Fund for many years, Gröneveld left a bequest of €5,000 in his last will. We are grateful to Professor Gröneveld for his contributions to the University of Twente and the Twente University Fund.

DONATIONS FOR UT RESEARCHERS

In recent months the Fund received two periodic donations for two UT researchers totalling €50,000 each. Professor Marcel Karperien received a gift to fund his work on an injectable plaster for osteoarthritis, and Professor Michel van Putten received a gift to benefit his research on the prevention of memory impairments due to ageing. The donors, who wish to remain anonymous, are both retired from successful careers in business and wish to make a meaningful contribution to society together with their partners. Both elected to donate to research projects at UT in order to support efforts that will make a real difference in the lives of patients. This also affords them the opportunity to maintain contact with the researchers and follow the progress of their work. The gift to Karperien was further motivated by the fact that the donor's daughter is a rheumatologist. One of the donors is a UT alumnus, the other was referred to the University Fund by an alumnus. Our sincere thanks to both couples for their support!



SUPPORT THE TWENTE UNIVERSITY FUND!

You too can support the University of Twente via a one-off gift, periodic donation or a testamentary bequest to the University Fund. You can also set up a fund under a name of your choosing for a purpose that aligns with the objectives of the University Fund, giving you full control over how your contribution is used. The minimum endowment for Designated Funds is €10,000.

Show your support!

Information: www.utwente.nl/ufonds or phone Maurice Essers on +31 (0)53 - 489 3993.

Twente University Fund

PO Box 217, 7500 AE Enschede, The Netherlands.
Bank account number: IBAN NL09 ABNA 0592 7191 89, in the name of Stichting Universiteitsfonds Twente, Enschede

WERE YOU
THERE?



Photos: Gijs van Duwerkerk

'Twente has all the ingredients
needed to launch a successful
startup'

INNOVATION LECTURE



CONCERT AGAINST RHEUMATISM

'Support research into the "injectable plaster" on www.steunutwente.nl/projecten'



Photos: Nic Linper

AMBASSADORS' DINNER



Photos: Martin Sort

It's the end of another day, but outside it's still bright, as summer stretches daylight deep into the night. The sun refuses to set, reluctant to go to bed. These are the perfect evenings to head back out after dinner for a cultural nightcap, especially with the newly refurbished campus Open-Air Theatre beckoning... TEXT Lidewey van Noord PHOTOS Arjan Reef



CABARET AS A CULTURAL NIGHTCAP

With temperatures still a bit too chilly for an outdoor performance on 1 May, the show sought shelter in the Amphitheatre at the Vrijhof. Up first were De Blonde Jongens en Tim, suited up in tight denim shorts with bright green sneakers for the eponymous blond boys and mountain boots in the same shade for Tim. The dynamic act blended humour, music, dance and surprises – and Tim's fixation on the chocolate in his belly bag. After a fast-paced performance that

included belly dancing, singing and a down-and-dirty fist fight in slow motion, it was clear why these 'boys' nabbed the audience award.

Next to take the stage was cabaret artist Sietse Manning, who expounded on 'the most animal-friendly method to secure small pets to the ceiling', student life, Dutch traditions and women's emancipation. Winner of the Groningen student cabaret festival Pieter Verelst from Flanders was the

final act, with a penetrating and by turns preposterous show about his brother, also marking the evening's musical high point.

The Open Air Theatre is ready and waiting and the coming months promise a packed cultural programme of cabaret, dance, theatre, song and music, and plenty of spring and summer evenings to enjoy a cultural nightcap.



For details, visit www.cultuur.utwente.nl

For Victor Witte, senior project leader at the national police service centre, obtaining a Master's degree was a long-held dream. 'You might even say it was on my bucket list.' In 2011 he enrolled in the Master's programme in Public Management at the University of Twente, and last year he completed his degree. 'I choose Twente because the programme there had a very practical focus and that appealed to me.' TEXT Lidewey van Noord PHOTOS Rikkert Harink

MASTER IN PUBLIC MANAGEMENT

Having begun his career with the police as an administrative assistant, today Witte works as a project leader, helping the Quality & Control Team to design the national police service centre's internal control structure. Cost-cutting measures within the police force led to the need to restructure the Netherlands' largest official organization, and in 2013 it was consolidated into a single national corps with a constellation of police units that are larger than before. According to Witte, 'Operational management is no longer the responsibility of the regional units, but happens at the national level. While this has cut down on bureaucracy, the organization has also become noticeably larger, and we need new mechanisms to steer it down the proper course. The Master's in Public Management has given me the tools to take on that challenge'.

Strategic insight

Looking back on the programme, one of the biggest eye-openers, says Witte, was the insight he gained into government systems. 'A lot of things are dictated by protocols, which are easy to just blindly follow. But when you do that, you risk losing sight of what's really at stake and of whether the procedures applied are even

effective.' Witte is therefore pushing for an alternative organizational structure, one that is less rigid. 'How things unfold is often determined to a large extent by happenstance, and that certainly applies to police work, too. Based on this understanding, the important thing is to create broad frameworks and then have the flexibility to respond to whatever comes your way.'

Thanks to his degree in Public Management, Witte says he can now look at things from a different, more strategic, perspective. 'That's also given me peace of mind. I realize now just how important timing is. You can't change things on your own: the organization has to be ready for it.'

25 YEARS OF MPM

In September 2014, the Executive Master's programme in Public Management entered its 25th year. Since its creation, MPM has evolved into a leading degree for public sector professionals. On 10 April a conference was held to mark this special anniversary, with a programme that looked back on the last quarter-century and envisioned MPM in 2075. Among the speakers were former state secretary and MPM alumnus Fred Teeven, former D66 party chairman, Upper House member and chairman of the board of Menzis health insurance Roger van Boxtel, Tilburg University European Studies professor and publicist Paul Scheffer, and Canadian ambassador to the Netherlands James Lambert, MA.



THE SUSTAINABLE ENERGY OF ANGÈLE REINDERS

HIGH TECH, HUMAN TOUCH

Her first foray into sustainability was back in a primary school project. Conclusion? Solar energy is the best bet. Fast forward to today, Angèle Reinders is a sustainable energy expert at UT's Faculty of Engineering Technology, where she studies the performance of large-scale PV systems from on the UT campus all the way to Jayapura on the other side of the globe. 'It's great to be working here on themes that are well vested in the organization.' TEXT Hans van Eerden PHOTOS Eric Brinkhorst

Angèle Reinders started out as an art student. But while painting was fun, it didn't offer quite the challenge she was looking for. She found that challenge in physics, at Utrecht University, where she ended up writing her thesis on a topic tied to sustainable energy – the surface physics of solar cells. She subsequently joined a different department, 'Where I was involved in interdisciplinary research on energy transitions, spanning technology, applications and economics'.

PV systems

Reinders' PhD research focused on photovoltaic, or PV, systems, used to generate electricity from light: 'On how they work in practice, what measurements you can conduct and what can you learn from simulation models.' Her research took her to Fraunhofer in Germany and later to Indonesia, where she studied autonomous PV systems (not connected to the electrical grid). 'I looked not only at the effectiveness of the technology, but also at how users deploy it and

their financial capability.' Her findings inspired her to co-found PicoSol, a foundation that helps people in developing countries set up their own solar energy projects.

Industrial Design

Via projects for the World Bank (on poverty reduction and sustainable energy in Asia) and Delft University of Technology (where she was later also appointed part-time professor), Reinders' arrived at Twente in 2001, where she helped to set up the university's Industrial Design

programme and segued into research on the interface between industrial design and energy supply. 'Research into the combination of product development and sustainable energy was simply non-existent.' Together with a team of PhD candidates and students, Reinders now conducts 'design-driven' research on solar energy and other sustainable energy technologies. She develops models to predict yields, looks at how the technology is applied and how it interacts with users. 'What's the most efficient way to implement sustainable energy products in a user context? That's a complex problem.'

Smart grids

Take smart grids – networks that use information technology to buy and supply energy, including locally

up with a new interface for the home energy management system based on evaluations of the energy balance and end user sessions. In practice, the concepts formulated by engineers and technology developers are not always the best all-round solution. That's where industrial design comes in.'

Sustainable campus

Reinders hopes to expand this line of research. 'I think we need to take an interdisciplinary and application-oriented approach to this research here in the Netherlands,' she says, despite the fact that only 4.5 per cent of our energy comes from sustainable sources. 'That's almost the lowest in Europe, even though solar energy already offers good value for money compared to traditionally generated electricity. So what's holding us back?'

maintained, and they've set up a training programme with local technical colleges. And the local university will be researching solar energy. Attempting to build a self-sufficient PV community is ambitious, for sure, but everyone is very committed.'

Collaboration

The key to success is collaboration, and Reinders is always open to working with others, whether with UT colleagues in other disciplines, energy firms, energy component developers or companies like Philips (LEDs), Nedstack (fuel cells) and the ECN energy research centre. She also has ties with German and American researchers and is involved in the IEEE Photovoltaic Specialists Conference. At the 2017 conference in Washington, she will

THAT VISION FITS ME



generated wind and solar power. 'If you only focus on the technical side, you won't reach all your stakeholders. You have to think about how you inform end users in order to avoid the 'not in my backyard' mentality and energy-inefficient behaviour. Good product-service combinations are essential to the success of smart grids, so that's also part of my research.' One of the projects Reinders has been involved in is the Powermatching City pilot in Groningen. 'We came

Reinders herself is also actively involved in efforts to 'green up' the UT campus. 'We're running a living lab with two trial PV systems on campus rooftops to investigate the grid potential of solar power. As a researcher, it's really ideal to be able to use these local demos and talk with Facility Department staff about campus power.'

Jayapura

Angèle Reinders is equally positive about her collaborative activities in Jayapura (colonial Hollandia), in the Indonesian province of Papua, where she is working on a PV systems project initiated by the Netherlands Enterprise Agency (formerly Agentschap NL) aimed at research, education and disseminating knowledge to the local population. 'Our partners are very determined to see this project succeed; the test system is well

even serve in the prestigious role of conference chair.

UT Indonesia

Yet Indonesia always beckons. Angèle Reinders and several UT colleagues are now working on a programme to enable Indonesian research assistants to conduct energy research at UT. 'We're keying into Indonesia's new policy line on sustainable energy. UT has lots of expertise to offer, including on things like biomass, new combustion techniques, and the Master's in Sustainable Energy Technology and advances in IT, for which UT is famous. It's great to be working here on themes that are well vested in the organization. High tech, Human Touch – that vision fits me.'



FEEDING THE WORLD WIDE WEB

Headed for a career in biology and physics, Dirk-Willem van Gulik was sidetracked by the rise of the internet. In fact, his CV parallels the evolution of the world wide web. Now, he's giving back by drawing on his UT training as an engineer.

TEXT Hans van Eerden PHOTOS Kees Bennema



Dirk-Willem van Gulik, at the rear, hunched over the enrolment table – still quite a puzzle in those days.

Looking back on his student days, Dirk-Willem van Gulik most values the preparation he received at UT and the fact that he was able to take part in projects in an international setting. 'The community at and around the university was very open and accessible, with lots of people from various cultures, and that helped me later on, when I was living abroad as an expat.' 'I remember organizing a conference with my student association, S.V. Arago, in 1990,

which also included students from other countries. That was right around the time internet was emerging, and was one of the first events for which we used email.' Van Gulik also has fond recollections of the Euros rowing club and TSAC climbing association. 'The sports centre had a fantastic climbing wall. It was the first in the Netherlands, and pretty unique in those days.'

His first choice was biology, but an uncle advised him that engineering was where the real opportunities lay, so Dirk-Willem van Gulik enrolled in Applied Physics at the University of Twente, where biophysical engineering offered the best of both worlds. His internship at a European Commission Joint Research Centre (JRC) in Italy focused on biology, on modelling the growth of marine algae using satellite images.

Data access

Back in the Netherlands, Van Gulik had already been in touch with the ITC geo-information institute in Enschede, now part of UT, to have his satellite images processed. But once in Italy and confronted with container-loads of tapes, the real challenge became accessing the data. He knew that the CERN research institute, cradle of the world wide web, had come up against similar problems. Perhaps, Van Gulik thought, he could adapt their 'data server' for his own needs.

Apache

One thing led to another and Van Gulik became involved in the open source web server software movement, ultimately co-founding the Apache Software Foundation. Apache was Europe's ticket to join the international standardization of URLs, the HTTP protocol and the SSL encryption protocol. In the late 1990s Van Gulik moved to San Francisco, where he assembled a large group of Apache developers from around the globe to help advance web server technology at Covalent and calibrate it for functions such as online banking and social sites. During those years, Apache's market share grew to above eighty per cent.

Joost

Around 2005 Van Gulik returned to the Netherlands, where he helped

launch Joost, a startup for web video services. But the time was not ripe, with Hollywood refusing to grant licences. Now Netflix and HBO are taking the industry by storm, but they, too, are encountering the same problems. Their solution is to create their own high-quality content with series like House of Cards and Game of Thrones. But for Joost back in 2008, that was too ambitious. However, Van Gulik did enter the world of content, at the BBC.

BBC

The British Broadcasting Company was embarking on a full-scale modernization of its internet platform, Van Gulik explains. 'Increasing use had led to rising infrastructural costs that were not being met by income from radio and television licence fees. We went back to the basis, building a web server infrastructure and configuring software tailored to an organization that needs to distribute a huge amount of content but with limited resources.' The project was a success, as was proved by the online coverage of the London 2012 Olympics. Having completed his assignment as interim manager at the BBC, Van Gulik now works as an independent consultant. But his ambition has not changed. 'My work involves solving tough technical problems within the bounds of a certain business model.'

Brink

The online world is big, to be sure, but according to Van Gulik, we haven't seen anything yet. 'We're on the brink of a massive shift towards the internet as both a utility and a public space. So how should we handle the big data being collected by the constellation of devices around us? When your insurer knows how often you go to the gym, for example? And what about security and privacy issues?'

Dirk-Willem van Gulik (b. 1968) studied Applied Physics at UT. In 1991, after an internship in Italy, he stayed on at a European Joint Research Centre and introduced web servers for large-volume data processing. In 1999 he headed to San Francisco to develop open source software for web servers, and was the co-founder (and later president, until 2007) of the Apache Software Foundation. From 2008 until early 2015 he was employed by the BBC Future Media & Technology Group as chief technical architect. He now runs a consultancy for investors and startups in Leiden.

House of cards

All this requires a more robust internet framework than what we have now. The current software is like a house of cards, Van Gulik says: the foundation has to be rebuilt from scratch. 'Yet there's no collective master plan for this utility.'

'The internet is on the brink of massive change.'

and then there's the segregation of all the different platforms, like Apple, Android and Facebook. They're all key players in the public domain, but they are no longer a part of the open internet – they're worlds unto themselves, beyond the technical and legal reach of either the people or democracy.'

Overlap

The issues raised by Dirk-Willem van Gulik have not only a technical dimension, but also a societal one. That technology touches on questions of philosophy and culture is something he'd already learned back at Twente. 'These subjects weren't strictly separated. For instance, I learned that you can apply the basic principles of engineering to any problem, whether you're building for bits and bytes that flow, or for oil or liquid helium, it's always an interesting practical engineering puzzle.'

RESIDENTIE 7-2



Hanging on the wall of the living room of Residentie 7-2 is a small Delft tile bearing what sounds more like a cry for help than a wise maxim: Bottle of beer / I'll drink you all / even should I / have to crawl. Another wall is papered with liquor bottles, making the living room feel more like a pub. TEXT Lidewey van Noord PHOTOS Rikkert Harink

A total of 11 students live on the second floor of this complex on Calslaan: three gals and eight guys. They enjoy living on campus: 'I spend more time at university than in the city', says Vera van den Groenendal, 'and living here means I can sleep in longer after a night out'.

Beer, parties and the yearly barbecue with former residents, these are the main activities at Residentie 7-2. The figure lying in the corridor, face down, pretty much sums it up. BOB's the name. Dressed in worn jeans, he looks rather the worse for wear. 'That's BOB the Zombie', explains Tom van Boven, the housefather. 'That's what living here three years does to you.' Having lived here almost nine years himself, Tom should know. Apparently, BOB owes his existence to a zombie-themed volleyball tournament in which Residence 7-2 was a player short. 'We took him along to complete the team because we didn't have enough people to make up a whole one.' The life-size rubber doll has been in residence ever since. The students who live here choose their house-mates themselves. 'The interviews with candidates are always a lot of fun', says Samira Nawrath. 'We'll ask questions like: What are the two coolest characteristics of a kiwi? If you were a traffic sign, which one would you be? What's the difference between a wagon load of bowling balls and a wagon load of dead babies? The more original the answer, the better.'

BBQ

Former resident Dirk-Jan van den Broek (BSc EE 2010 MSc EE 2012, now doing his PhD at UT) came to live here in 2004 and knew the last few of the first generation of students who made the house into what it is now. 'It was already a student house before that too, but everyone was more isolated. At a certain point there were a few people who decided to start eating meals together and wanted more of a close-knit group. They're also the ones who came up with the name Residentie 7-2.' Around ten years ago a new tradition was inaugurated with the first annual barbecue, paid for by former residents. 'It's grown a bit out of control now', Dirk-Jan admits. 'It all started with a barbecue under a tarp, but

now it's an annual party with a massive budget and a theme. We had a Jacuzzi one year, a rodeo bull another year, and lots of bales of hay when we had a "harvest" theme. Of course, that all ended in a big hay fight and everything going up in flames.'

'The barbecue is also a reunion', explains former resident Floris van den Brink (BSc EL 2008 and MSc EE 2011, now also doing a PhD at UT). 'It's the main time we all get together. We hope it will continue to be a recurring event that regularly brings everyone back to the campus.'

Ceiling

The most noticeable feature of the living room is the ceiling, from which hang a multitude of objects: shoes, an empty Goldstrike bottle, the grille from a Volvo, posters, a bike... There's a story behind each item, so in effect the ceiling contains all the most memorable moments from the house's history.

It also betrays the fact that a striking number of residents studied electrical engineering. Samira goes over to a box on the wall, punches a few buttons and raises the 'party switch'. A myriad of coloured bulbs flash on and a festive mirror ball lights up. All that's needed to complete the party vibe is the mobile bar, which is in the corridor ready to be wheeled in. The flat logo provides a good indication of the interests of the average resident. Most of the symbols concern beer: hops and barley, the Grolsch swing-top bottle cap and even a buzzard, which 'stands for boozing'. The other animal, a beaver-tailed raccoon, elicits laughter. Apparently, it has something to do with female genitalia.

My tour is almost at an end when Tom suddenly calls out: 'I almost forgot to show you heaven!' He points to a door. 'We call the loo the shite-hell because it always smells, but we also have a heaven.' He opens the door of the other loo to reveal a baby-blue and orange striped toilet seat (the house colours; the seat was a gift from a former resident) and walls and a ceiling plastered with posters of naked women. There's a lot you can say about Residentie 7-2, but not that they don't take their interests seriously.



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

'Every iPhone snapshot
you take gives you
proprietary rights'

Piet Mondrian's *Victory Boogie Woogie*, Glen Miller's *In the Mood* – both can be downloaded free of duties and charges. But it took seventy years. 'Thanks to laws dating from the pre-digital era', sighs Maarten Zeinstra. Maarten's job – his first – revolves around *open culture data*: releasing and providing access to cultural heritage. TEXT Berend Meijering PHOTOS Kees Bennema

CULTURAL *OUT OF* COPYRIGHT

Zeinstra obtained his Master's degree in Philosophy of Science, Technology and Society (PSTS) at UT. He now works from a top-floor office in a listed canal-side building in Amsterdam as a copyright and technology advisor at Kennisland, an independent think tank for social renewal in education and culture. His area of expertise is intellectual property law.

Philosophy of Science, Technology and Society

'Intellectual property plays a key role in emerging digital services. Netflix and Spotify have to adapt their offering per country, for example, because proprietary rights aren't harmonized. And if you browse around Wikipedia – the world's largest knowledge platform – you'll notice art is conspicuously absent. Even the culture and TV shows our parents grew up with are mostly unavailable to us, so many of their cultural reference points elude us. All thanks to intellectual property.'

'Back in another day and age, intellectual property rights applied to the production of books and other works that were labour-intensive and relevant to no one but publishers. But today it applies to everything and everyone: every iPhone snapshot you take (or Tweet, Instagram or Facebook message) gives you proprietary rights.'

'Philosophy of Science, Technology and Society was crucial for me', Zeinstra says of his degree programme. 'We studied how society and technology interact. The internet and digital technology are fast rendering the foundations of our society obsolete. That also applies to how we treat and consequently can use intellectual property.'

Access

Zeinstra has helped to create a calculator (see www.outofcopyright.eu) that can be used to find out if an

Composition London by Pieter C. Mondrian (Amersfoort 1872-New York 1944). Now freed of copyright restrictions in the Netherlands, 70 years after the artist's death, but still under copyright until 2019 in the USA, his second home, and therefore barred on Wikipedia. Also see: M. Zeinstra: 'Mondriaan need not apply'. [Illustration in Dutch edition]

AGENDA

11-18 August 2015

CuriousU: University of Twente's
Summer School

31 August 2015

Opening Academic Year

28 September 2015

MESA+ Meeting 2015

27 november 2015

Dies Natalis

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www.utwente.nl/evenementen

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artwork is in the public domain and under which conditions it can be disseminated and reused. He also offers master classes in which he teaches museums and other cultural institutions how to open up their collections for both actual and virtual visitors via social media (see www.opencultuurdata.nl).


'And I'm also collaborating on *Europeana*', Zeinstra continues. 'That's a site for heritage from the entire continent, now with more than 40 million items.' Including a sound clip of his own: *A typical Friday evening office drink*. In what could be a throwback to his days as chair of PSTS student association Ideefiks, the clip features a tipsy voice ringing in the weekend. It's not exactly high art. However, as Zeinstra assures us, 'It's freely available under the new open standards for the heritage sector'. And one day, he believes, it will be valued by posterity – as offering a glimpse into early 21st-century office life.

'APP STORE' FOR 3D PRINTING

TEXT Hans van Eerden PHOTOS Kees Bennema

Imagine being able to print a 3D model with a single press of a button, even at home – not likely with today's user- and internet-unfriendly consumer printers. Students enrolled in UT's Creative Technology programme came up with a solution, drawing up a fictional business plan that became reality last year with the launch of Printr, co-founded by three students and alumni from UT and one from Saxion University of Applied Sciences. After a Kickstarter launch that generated pre-orders, feedback and a community, the startup is now 14 strong and has students working development jobs in Enschede and doing marketing and sales in Amsterdam.

'Our goal is to get all 3D printers worldwide running on our software platform, Formide', explains CTO Christer Beke. Currently the platform is still being sold as a hardware package, since modern printers lack the necessary electronic capacity. 'We're working with manufacturers to get our software integrated in their next generation of printers.' For Printr, the technical challenge lay in creating an 'internet of things'-type software that was stable and scalable. Various research questions still remain to be investigated at UT, for example regarding efficient 3D model processing and the recognition of prohibited objects (such as weapons). The operating platform has to work on all types of printers and must also offer broad functionality in the cloud, says Ter Beke. 'It's got to be able to manipulate 3D models, check and correct, monitor your local printer via the internet and send commands to basic printers anywhere else. Our intention is that developers will design applications for our platform and that users will pay whenever they go to print a model created with that app.' From hardware to software to app store.



'Our operating platform has to work on all types of printers'

For further information, visit www.pintr.nl