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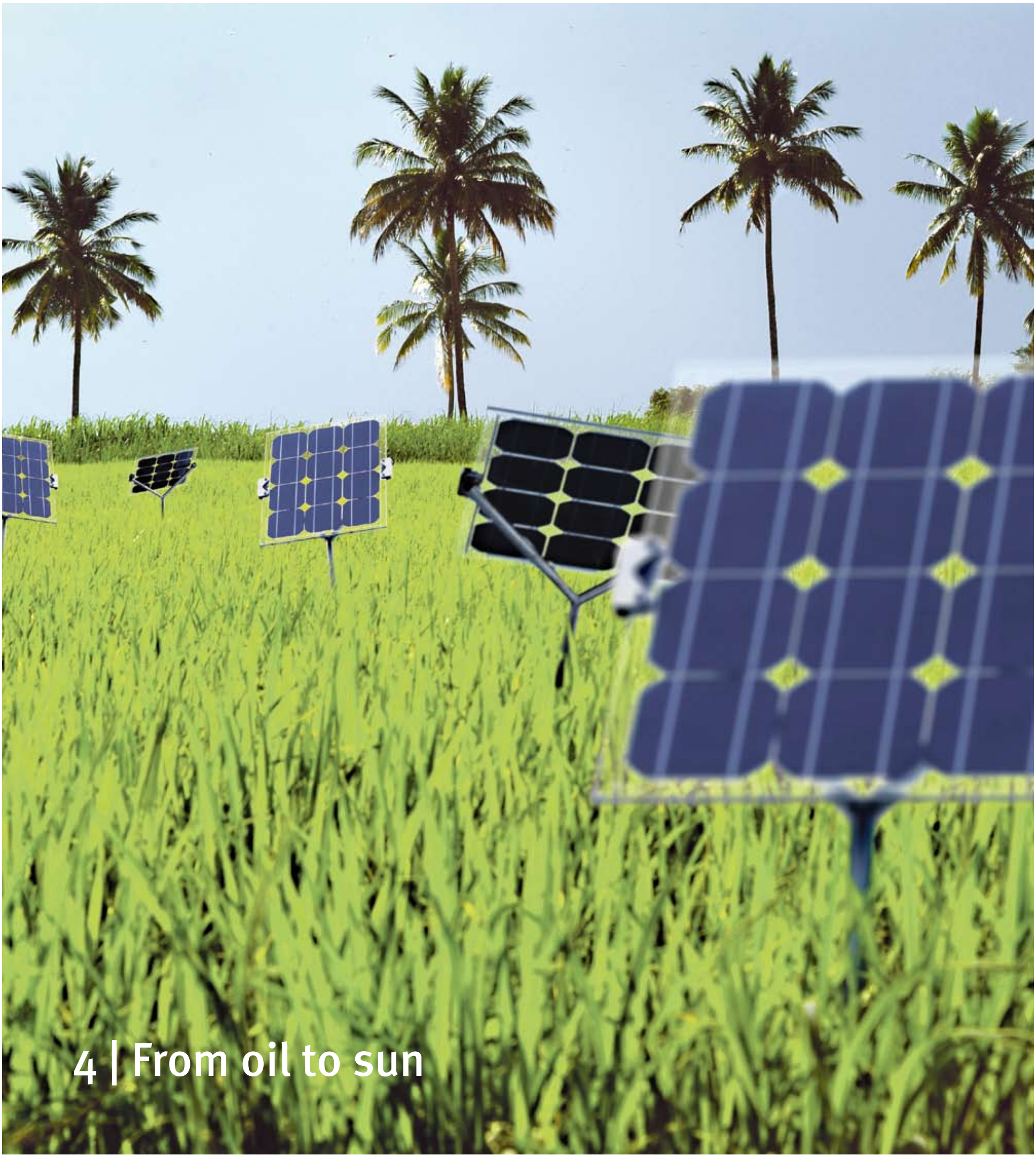

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Fred Steutel done nagging

Having shared everything that surprised, bothered, annoyed, or genuinely impressed him for the past ten years, our columnist Fred Steutel, Professor Emeritus of probability and Statistics, will put down his pen. Yes, he too submitted his columns via e-mail, but to me, Fred - who'll reach the respectable age of 80 today - is the type that sits at his desk with a dip pen. I'm biased of course, which undoubtedly has to do with the man's ripe old age, but grant me that romantic illusion. Still, the articles Fred has faithfully produced for Cursor over the years have always been surprisingly up-to-date. Very perceptive and deliciously blunt at times, he always managed to find the sore point. And I can tell you it's a breath of fresh air for an editor-in-chief at an institution where no employee or student dares speak their mind. We're always very articulate at the coffee machine and the dinner table, but actually venting our criticism is a whole different ballgame.
This Cursor includes Fred's last 'Effe zeuren' contribution, but who'll take over? For anyone who thinks the title's too sulky: we can change that. If you're interested in sticking your neck out, please call me (06-51007079) or send me an e-mail **(j.l.konings@tue.nl)**. I'll be waiting...

No reason

Every photographer has a different approach: intuitive or knowledge-driven, with an eye for either the bigger picture or the smallest detail, with or without technical perfection, fond of flashing or in search of the most beatiful natural light available.
I combine, although knowledge, detail, and technique are predominant, and I easily have four flashes at hand. Still, sometimes something just 'feels right' after two minutes. The sun on Indre Kalinauskaite's nose, yes, that's where it belongs. The fence, that wall? Don't ask. They were there. It feels right. No reason. **See page 6.**

TU/e Technische Universiteit Eindhoven University of Technology

Rewwwind
www.tue.nl/cursor

Our Rewwwind feature provides you with snippets of last week's news. What happened online after the previous Cursor magazine was published?

'Clean' diesel and gas on campus

November 16, 2011 - In 2012, TU/e's university campus will be treated to a gas station, and in 2015, a small TU/e factory should be operational that makes biofuels from waste wood. Researchers at TU/e are developing a demo reactor that will convert the university's annual forty metric tons of waste wood into substitutes for diesel and gas. The gas station will be used for demonstration mostly, but it may become available for employees to fill up their tanks in the future.

GLOW glad to see TU/e return in 2012

November 14, 2011 - The GLOW organization has asked TU/e to participate in the event next year as well. Currently, there's talk of a work of light art in the city center, "but how exactly remains to be seen", says prof.dr.ir. Gerrit Kroesen, chairman of TU/e's art committee.

Grand gala for students for anniversary TU/e

November 9, 2011 - On Friday, December 9, TU/e will celebrate its 55th anniversary with a grand gala for students and their partners. The dance's dress code is white tie and it will be held at city hall. Ticket sales have started. Check **www.galatue.nl**.

TU/e grounds finally 'street-viewed'

November 8, 2011 - As of last week TU/e campus can be virtually visited using Google Street View. The university grounds were already extensively recorded over a year ago, but the edited images have only been online since last week.

Flashback

Chess 1965 versus 2011

TU/e knows an unbelievable number of associations, including zero chess clubs. That's not to say the university isn't chess-minded: it was in the past and still is today. On October 20, 1965, Chess Grandmaster and former world champion Max Euwe visited the Institute of Technology to humor dozens of chess fiends with a simultaneous exhibition. On Saturday, November 12, over three hundred youth players came to the Auditorium for the Dutch Open Rapid Chess Championships.

The first time the event was organized, Ger Dekker was tournament director. He remembers university secretary Harry Roumen being asked for accommodation and consenting immediately. "The matter was settled in twenty minutes." Still, the first edition wasn't held at TU/e. Fire at the Auditorium queered the pitch, but ever since its reconstruction, the university has been hosting the event, with Roumen opening the tournament. (NS)

Clmn Time travel

There is a photo exhibition at the Central library presenting a retrospective of student life at TU/e. Walking past the pictures I often asked myself "How different was their student life compared to mine?" Unfortunately, the pictured faces are silent, so I'll have to use my imagination and engage in time travel. You're most welcome to join me.
First of all, these students didn't have the Internet. If they had questions, they couldn't google them or check Wikipedia. Moreover, they couldn't ask their friends by sending them Facebook messages or e-mails. They must have had outstanding memories or visited the library more often than I do. Forget about the Internet. They didn't even have personal computers. If they wanted to perform complex computations, they couldn't use Matlab and plot results. Instead, they probably wrote everything down on paper or created complicated FORTRAN scripts on punched cards, and visited huge rooms with large, noisy machines.
Moreover, Dutch students never had the opportunity to visit their colleagues in the USSR or China because these were their ideological enemies, implying that the exchange of ideas and discussions at conferences were impossible.
Gloomy picture, isn't it? What surprises me is that despite my negative impression these guys look happy. They enjoyed their lives as I and my friends do now. Moreover, this generation landed on the Moon, invented microprocessors, managed to control nuclear energy and created the life we're living now. Realizing this simple fact is encouraging to me, because if these people achieved such success without Google, Matlab and the help of smart foreign colleagues, then shouldn't we be able to do so much more, having all these available? Of course we should, and that's why every TU/e student should stick to their academic enthusiasm and always strive for more.

Sultan Imangaliyev, from Kazakhstan, is a student of Systems & Control, Department of Mechanical Engineering

Vox Academici

Prof.dr. Rint Sijbesma, professor of Supramolecular Polymer Chemistry

How revolutionary is the Groningen nano-4WD?

Prof.dr. Rint Sijbesma. Photo | Bart van Overbeeke

The Groningen research group supervised by Ben Feringa was featured on the cover of Nature with their nanocar last week. After years of experimenting, they managed to build a molecular engine driven by an electric signal, measuring a mere 4 by 2 nanometers. And yes, the molecule does rather look like a 4x4. But exactly how spectacular is this development, and will we actually be able to implement nano-engines as medication trucks in the future, as some media have suggested?

"Although the media tend to exaggerate the facts, this time the attention is absolutely deserved. It's a downright fabulous invention, one that every scientist dreams about." Rint Sijbesma, professor of Supramolecular Polymer Chemistry and affiliated with the TU/e Institute for Complex Molecular Systems, makes no secret of his admiration for his Groningen colleague. "Today, molecular engines are widely researched, and Feringa is one of the best researchers in the field. There's a reason he received the Spinoza Prize several years back. Upon receiving the prize, he promised to use his results to develop a molecular vehicle. And not only would the nanocar do very well in a beauty pageant, it also involves a lot of thinking and experimenting. It's a true chemical tour de force."

"The molecule resembles a car, except that its tires are more like paddles. It receives an electric shock from a Scanning Tunneling Microscope tip that makes the paddles move. Although the construction is a bit wobbly, the movement does follow a linear pattern. And it's that preprogrammed, controlled movement that makes the nanocar such a genius device. Years ago, an American chemist already claimed to have developed a nanocar, but it wasn't driven and moved aimlessly. On top of that, his nanocar didn't even have a molecular engine. A sorry excuse for a car, come to think of it. It's another reason why the Groningen ride can be considered the first-ever nanocar."

"It's tricky to speculate possible short-term uses for this nanovehicle; it partly depends on your own imagination. I think we should consider this invention an important aspect of the future school of thought. It's a major contribution to fundamental molecular research. Of course it's great to think ahead, but it's way too early to already speak of human implementation. Besides, these nanocars won't be used for the transport of medication. The body has more than enough flowing and moving going on as it is, it doesn't need any extra engines. In medication transport, the most important issue is where it should be delivered. It's a different matter altogether."

"At TU/e, we're also trying to improve the development on nano-engines. Within the Institute of Complex Molecular Systems, Dick Boer's group is conducting extensive research into molecular engines and transmutations in molecular systems. Thanks to his past career at Philips, he knows a thing or two about possible uses for molecules like these. But for now, any practical uses for the nanocar are still out of reach, if only for the fact the experiment can only be conducted at absolute zero. It will remain a dream car for now." (NT)

Capoeira show in Dommel Tunnel

20 members of ESCV Impulsão demonstrated the Brazilian martial arts-dance art form capoeira in the Dommel Tunnel on Wednesday night, November 9. Light festival GLOW, and the tunnel's blacklight especially, had sparked their enthusiasm.

1 on 1 is how the playful mock fight is played. It's accompanied by rhythmic drumming. Capoeiristas always play in white, which made their performance in blacklight even more spectacular.

15 minutes, that's how long the exciting performance lasted. According to Mike Wilmer, student of Electrical Engineering and member of Impulsão, the tunnel was a little cramped because of the large number of visitors walking around.

Photo | Bart van Overbeeke

From oil to sun, water and wind

Sustainable energy | Judith van Gaal and Tom Jeltes
Illustration | Bart van Overbeeke

There is plenty of sunshine, the land is brimful of raw materials and there is more than enough water. If there is one country with sufficient sources of sustainable energy, it must be Indonesia. With oil getting more and more expensive and scarcer, the demand for alternative sources is increasing. Eindhoven University of Technology (TU/e) has played an important role in an extensive project with the aim of raising sustainable energy in Indonesia to a higher level.

"The electricity in some areas is now sometimes cut off a few hours every day", says project leader ir. Mara Wijnker –project manager of sustainable energy at TU/e- to illustrate the increasing shortage of energy in Indonesia. "The fact that Indonesia consists of many different islands does not make things any easier either. We've seen, for example, that the province of Papua was without diesel, because a carrier was late. For the electricity supply they depend largely on diesel being brought in by ship. The government subsidizes electricity prices considerably. The industries and households pay less than what is required to generate it, but of course that is not a healthy situation. Once energy prices go up and people have to pay for the real costs, sustainable energy technologies can compete better with the current power supply via the grid. At locations without a grid, sustainable energy technologies may be at once the most sustainable and the cheapest solution available. What is also quite favorable, is that the government in 2020 wants to generate 25 percent of the energy by means of sustainable energy technologies."

The relation between TU/e and Indonesia goes back seven years. Seven years ago dr. ir. Lex Lemmens (former director of what was then called the Technology for Sustainable Development Center and now forms part of the Eindhoven Energy Institute) and ir. Patrick van Schijndel (then staff member of TDO/United Brains) visited Indonesia for a lecture, and ideas sprang up for further cooperation. 2006 saw the start of the Carepi project – which focuses on bioenergy in the regions of North Sumatra, Yogyakarta and Central Java.
An extension of this was the Casindo project, preparations for which had been begun by the Dutch government in 2008 and which was started in 2009. The areas of West Nusa Tenggara and Papua joined in and the goal was also broadened: promote developments in the area of sustainable energy.
The partners have wanted to ensure that the universities involved strike up joint ventures with local enterprises and the industry so as to be able to apply the knowledge directly in regional situations. Casindo stands for CApacity development and strengthening for energy policy formulation and implementation of Sustainable energy projects in INDOnesia.
The project consisted of three major components, says Wijnker. The Energy Research Center of the Netherlands was the chief player for the development of the energy policy within the government. ETC Energy led the capacity buildup section at local Regional Training Centers, which are called SMK's (where the mechanics and installers are trained who have to work with the new technologies). TU/e took care of the setup of research and education in the area of sustainable energy and efficient use of energy.

Some thirty lecturers from various Departments gave lessons and workshops – both at TU/e and at five universities in Indonesia. While most of them are affiliated with Eindhoven University of Technology, project leader Mara Wijnker has also attracted several teachers 'from outside' - expertise in the area of wind energy, for example, is limited at TU/e. The lecturers involved have also given workshops together with local industries in the area of knowledge valorization. The main reason for TU/e to take part in Casindo was the ability to fulfill a societal task. In addition, the pioneers hope that the future will see more Master students and PhD candidates coming from Indonesia to TU/e.

The lessons and workshops concentrated on solar energy, biomass, hydropower, energy efficiency, wind energy, energy policy and geothermal energy (which means that the internal heat of the earth will be utilized). These forms of sustainable energy complement each other beautifully; during the rainy season there is less sun, but more water.

The total budget for the project -subsidized by AgenschapNL- was four million and TU/e was granted nine hundred thousand euro. This amount was used to pay for the trips and the lecturers' working hours, but there was also forty thousand euro available per university to purchase materials or build installations. This is how Universitas Diponogoro in Semarang (Central Java) was able to realize workstations where laptops could be connected to solar panels, and a sustainable house was built in Yogyakarta to show students and other visitors how one can apply sustainable energy technologies -such as solar panels and a wind turbine- in a building.

Three weeks ago Mara Wijnker was still in Indonesia for the official conclusion of the project. In retrospect she is positive. "Education programs have now been developed at five universities. In two cases this is going to result in Master programs and in three cases in certificate programs. I enjoyed seeing how enthusiastic the lecturers were and how much has been achieved."
If indeed one can speak of any problems, they were minimal. According to Wijnker there is a great variety in the general level of knowledge and the command of English. "Although three of the five universities teach Bachelor programs, the level is lower than with our Bachelors. Two universities are working more or less at university level. The intention is, though, for all lecturers at Bachelor level to obtain Master's degrees in 2012 and for those who wish to teach at university level to obtain PhDs. On some occasions our lecturers had to aim for the basis, other times it was possible for them to deal with the subject matter in greater depth. The quality of English was also widely different. Sometimes lecturers and students speak English fluently, at other times somebody had to translate what we said into Bahasa Indonesia."

> "No electricity because a carrier was late"

Another thing noticed by Wijnker was that the Indonesian universities sometimes focus less on research. "Lecturers managed to convey their ideas orally properly and in a well-founded way alright, but some found it difficult to draft research proposals." And there was a shortage of resources. "This was illustrated by the fact that in Eindhoven they spent a lot of time in the library in order to download articles and consult books to which they have no access at their own universities."
That Indonesians are quite flexible in general, was considered to be an asset as well as a drawback by the project leader. "While on the one hand they adjust very well, they do have trouble meeting tight deadlines. I've also noticed that direct contact is everything. You can send three e-mails without ever getting any response. Often things turn out to have been organized very well, but they don't give you the necessary feedback." Political tensions were not observed really by the TU/e lecturers. "We once held a meeting at the hotel, because it was impossible to reach the university in Papua due to a demonstration."
Tony Hariadi was the contact for TU/e at Universitas Muhammadiyah Yogyakarta and shares Wijnker's enthusiasm about the project. "Thanks to Casindo we have created a strong team within the university and we've been able to set up a good network within the country.
The TU/e lecturers have demonstrated that they possess a great deal of knowledge in their fields. Many graduation projects of students are now related to technologies in the area of efficient utilization of energy."
Hariadi has great expectations in particular of biogas and biomass in his country. "They are the cheapest type of sustainable energy in relation to the investment involved. You hardly need any high-tech resources for them.
For instance, we have plenty of dung that we can use. One problem to be tackled is the conversion to electricity and the distribution. That will be the next step, though."
In Indonesia they are now going to develop further in the area of sustainable energy. The extent to which TU/e is still involved in that remains to be seen. Wijnker: "At present the Dutch government is not earmarking much money anymore for projects like this. We do keep contacts to the fore and are working on joint ventures in which students from Indonesia come and follow Master's programs at TU/e or enter PhD programs."

www.casindo.info

Prof.dr. Ton de Kok. Photo | Bart van Overbeeke

Door-to-door with billion-euro models

Logistic processes are characterized by uncertainty in time and quantity, supply and demand. Prof.dr. Ton de Kok's OPAC Group developed models that can manage these uncertainties and they've been used to advise companies for ten years now. It yielded the companies hundreds of millions, yet the challenge to convince managers to do things differently remains. "Each change is considered a risk, and that's a shame."

A quick calculation recently made De Kok realize that companies have at least made seven to eight hundred million euro through their cooperation with his colleagues at Operations, Planning, Accounting, and Control (OPAC, Department of IE&IS). "And now I'm only including the companies that published their results themselves." He's referring to four projects involving major players ASML, Organon, DSM and Philips Semiconductors (now NXP). For these companies, managing the spare parts inventory involves enormous amounts of money. The more accurate the estimate of what actual stock is needed at what location, the less excess stock and/or the faster any parts can be delivered. And that's reflected in a company's profit.

According to De Kok, most companies are using deterministic models to control their logistics. But these models don't take into account the inevitable uncertainty regarding demand especially. "Any mathematician will tell you these models are far from perfect, yet companies continue to work with deterministic software." The OPAC Group does acknowledge a level of uncertainty in their models, which leads to better results, according to De Kok. "It's about general models that can be tailored to find concrete solutions to specific company problems."

Experience has learnt that companies acting on said concrete predictions may save enormous amounts of money.

> "Any mathematician will tell you deterministic models are far from perfect"

De Kok: "Based on models developed under the supervision of my colleague Geert-Jan van Houtum, ASML now has thirty to fifty percent less spare parts in inventory. ASML hasn't published their savings, but I'd say it's yielded the company at least one hundred million euro over the past five years. On top of that, our efforts have resulted in less downtime of ASML machines (producing chips, ed.) at companies like Intel and Samsung. The impact of that involves a multitude of said amount." At Organon, savings on spare parts even reached 250 million, and after advice from De Kok et al., Philips Semiconductors made an extra profit of some one hundred million. "Companies like that have a lot of overhead, due to which any extra turnover more or less equals extra profit."

OPAC's triumphal progress started in late 2001 with the design of a joint planning for three companies (including Philips Semiconductors) that each covered a certain step in the manufacturing of DVD players. "We went live in only three months, and although it's been debugged after that, the system itself hasn't been changed once in the six years the collaboration lasted. It just worked!"

The professor of logistics has another recent example of the impact of OPAC's calculations on the management of billion-euro companies: "When the economy hit rock bottom in 2009, the demand for raw materials produced by DSM and its competition dropped to almost zero. DSM wanted to know whether or not it would be wise to shut down production for a while. The demand for final products only decreased by ten percent, but as a result, no one at the end of the chain wanted to replenish their inventory. Further upstream, that quickly resulted in a much greater decrease in demand, and DSM is at the very source. My colleague Jan Fransoo and his student Maximiliano Udenio then calculated when the market was to exhaust its inventory and start reordering. According to their calculations, that would be in July 2009. DSM decided not to shut down its factories, whereas the competition did. The prediction proved to be correct, which brought in an extra quarter million euro in sales for DSM."

> "You'd expect them to come running"

Despite the OPAC models' proven impact, it's still no picnic for De Kok to convince companies there's much more profit to be made. "You'd expect them to come running, but it doesn't seem to work that way. You can hand over several publications proving the effect, but a good model just doesn't cut it. You have to find managers that understand the implications and are willing to make changes." Changes are still mostly considered risks, De Kok thinks.

One of the things that have fueled OPAC's success is their understanding of business. Ever since 1996, TU/e has been the driving force behind the European Supply Chain Forum (ESCF), which today has thirty affiliated companies. "Although the first two years we drew full houses, we were doing it all out of love. At some point, we decided to charge a fee. And if a company is prepared to support a PhD student, they can join for free." For De Kok and his colleagues, ESCF is a "permanent thermometer" for business. "It's important, too, because that way we learn about specific, empirical domain knowledge, say inventory models for stores, which is indispensable if we want to advise companies."

The OPAC models aren't as formalized as those of economics, says De Kok, but they can be modeled after concrete situations. "I've come to realize formalized models are useful for training scientists only." In the real world, things are much more chaotic and although De Kok's models may not be entirely accounted for mathematically, they do explain the empirical data. "In the end, that's what should be important for engineers."

For students of Business Management that work with them, the models act like a black box – something goes in, something comes out, but the user can't put their finger on what happens exactly. De Kok: "Students sometimes complain, but then I show them my cell phone and ask them whether they fully understand what goes on in there. And of course they all have a cell. Just because it works." (TJ)

Indre Kalinauskaite | Spontaneous student is all-rounder

If there's a single characteristic that can be credited to Indre Kalinauskaite (25), it has to be spontaneity. She reconsiders her decisions only after she's made them - if at all. The Lithuanian student is studying Human Technology Interaction (HTI) at TU/e, and being a student assistant at the International Office, she's the driving force behind the Common Room.

Why she came to the Netherlands? Indre can barely recount her story. As ever, her decision was motivated by a feeling. In 2007, she ended up in the United States in much the same way. "I wanted to see for myself whether it was really that bad." She was proven wrong soon enough. "I was stimulated to be the best I could be, which I wasn't used to back in Lithuania."
Indre had come to like going abroad by now. "I knew I wanted to study in a European country where people speak English well. One morning I woke up and felt I should go to the Netherlands. Why? You tell me." And when Indre has a plan, it's not easy to change her mind. Even her mother couldn't bring her around. "Before I left I had to pay a couple hundred euro, but money was tight. My parents were pretty concerned and the day I was going to pay, I decided to call my mother. She tried to dissuade me, but I visited the bank right before closing time after all."
Everything worked out in the end - everything always does in her life. Not ever has the friendly student regretted leaving Lithuania for the Netherlands. And by now, her parents are convinced she's doing great. "Only recently, my mother even told me she's glad I made that payment back then."

Indre feels right at home in the Netherlands and at university. She's enjoying everything. "Let's sit by the window, I just love the view from here", she says as we enter the Auditorium.
Her choice for TU/e was made almost as quickly as her decision to go to the Netherlands: "I was looking for a good university and TU/e had a pretty good top-100 ranking. I didn't apply anywhere else, but luckily I got in."
She loves the university and met a lot of amazing people out here. Indre started out at Applied Mathematics, but, contrary to her beliefs ("If I make a choice, I stand by it") made the switch to HTI. It suited her better.
When in 2009 the social student came to the Netherlands, she started looking for work right away. "I was prepared to do anything, but it was bad timing. I checked with all cafes, but they wouldn't hire me anywhere." She also tried at university, exploiting her social skills. Indre eventually asked the International Office, which turned out to be in need for a student assistant.
She set up several projects in no time. She's one of the driving forces behind the Common Room, for example, the area in the Bunker meant as a meeting point for all nationalities. She also gave the Facebook page for international students a boost.
She's currently trying to steer clear from all those activities – partly because she'll be graduating this year and also because she feels things should take their course. All the same, you'll still find her at the Common Room almost every week, and she's continually being accosted and greeted by international students.
The 25-year-old is an all-rounder. She's an amateur photographer and her poems have been published in several magazines – a vent for her emotions. "I can completely lose myself in them." Her poetry is characterized by esthetics: she focuses on the beauty of words, her poems rarely tell stories. Right now, Indre isn't writing poetry. "There's no inspiration at the moment."
If she should name one thing she's missing from her homeland, it's her family – of course. "And I miss my two dogs." She sees her family once every two or three months. Her sister was here only last week. Indre is considering a PhD position, because it would be a challenge, but also because she'd make more money to travel back and forth that way. And it would allow her to buy a dog.

Interview | Judith van Gaal
Photo | Bart van Overbeeke