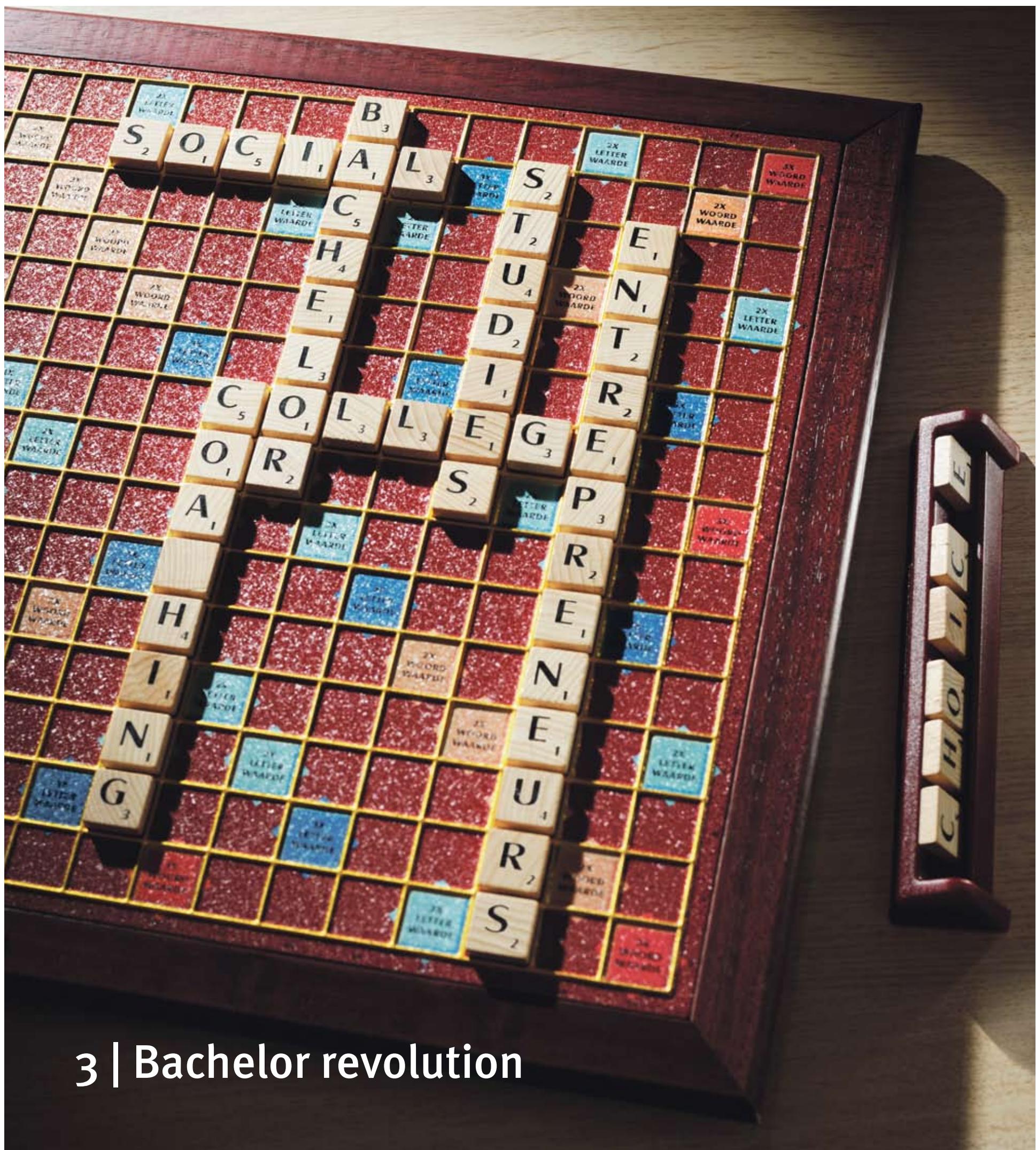


1 Cursor

September 8, 2011 | year 54

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For news: www.tue.nl/cursor or follow tuecursor on Twitter and Facebook



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Go to the comfort zone!

Why did our rector remind me of a reverend when I saw him addressing the students in full attire last Monday? Was it the robe, or was it his message that was repeated several times by other pastors of the international church? You've finally managed to touch down in the world's smartest region, and the first thing you hear from the pulpit at the start of the academic year is to move ASAP. Go west, east, north or south, but make sure you don't stay in Eindhoven your entire academic career.

Go to Leuven if all else fails, but for god's sake, just go! Stay in Boston, Shanghai or Helsinki for at least six months to find out whether they may not be a tad smarter than we are. You never know. After all, even the highly-esteemed international forum that generously praised our region last June could be wrong.

It was pure comedy to hear the students be summoned sixfold to leave their comfort zone. Wikipedia describes a comfort zone as 'a behavioral state in which a person operates in an anxiety-neutral condition'. Is that really how students feel these days? Studying stress-free, everything peachy keen? Or could today's student maybe feel the pressure of having to complete their degree in time, of awaiting their binding study recommendation? Perhaps those six months spent abroad are a good way to relax for once...



Cursor 2.0

There it is: the all-new Cursor. Familiar design, slightly different content. It's mostly background and human interest from now on. And you'll always get four English pages on the flipside: the back page is the English cover. Do you miss the news? Check www.tue.nl/cursor. We'll also be posting news on Facebook and Twitter, so there'll be enough for you to read. Would you like to comment on the new Cursor? Please do!

TU/e Technische Universiteit
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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?

Bicycle mechanic and book shop close doors

August 10 and 31 - Bicycle shop De Groene Fietser (the Green Cyclist) on TU/e campus has closed. According to bicycle mechanic Richard van der Vleut the place was crammed and it's been difficult to find staff to handle the unexpectedly high work load.

Study Store also closed its bookstore at TU/e. More and more, books are sold through study associations and the Internet, due to which the company decided there's no future in the Hoofdgebouw shop anymore.

First step towards permanent on-campus residential units

September 6, 2011- It may take until the end of 2014, but the three hundred permanent on-campus residential units will be realized. Board member Jo van Ham and Ingrid de Boer of Woonbedrijf (the umbrella organization of student housing provider Vestide) signed a declaration of intent Tuesday 6 September. The plan is to erect a fourteen-storey building

behind the current Potentiaal – bordering on the TeMa field. The units will be especially meant for international students and international university staff. As soon as the new construction is up, the 186 space boxes will be demolished. People are eager to realize another three hundred units, which would make for a total of six hundred units.

TU/e wants Graduate School to attract more foreign students

September 6, 2011- An increase of foreign students and a better insight into the quality monitor at design programs and PhDs. These are the main issues TU/e's Graduate School, officially starting this academic year, is supposed to tackle.

This academic year, after a lengthy period of preparation, the GS will start as a virtual organization. All departments will remain responsible for matters concerning management and content.

X Vox Academici

Prof.dr.ir. Gerrit Kroesen, Professor of Elementary Processes in Gas Discharges, Department of Applied Physics

Is the ban on the bulb useless?

After having banned the 100W and 75W light bulb, last week saw the ban of the 60W bulb as well. The energy-wasting bulbs convert more energy into heat than they do into light. In light of energy saving, the European Union has therefore decided to ban all incandescent lamps as of September 2012. The sale of light bulbs is currently being phased out. But last week, newspaper de Volkskrant published data calculated by the Energy Research Center of the Netherlands: because of the ban, there would be an extra 0.05 megatons of CO₂ emission. After all, the heat produced by light bulbs will be compensated by our central heating. An all too blunt statement, or was the bulb wrongfully banned indeed?

"It's definitely a good thing the bulb is being banned", says Gerrit Kroesen, Professor of Elementary Processes in Gas Discharges, who deals with lighting research daily. "It will save a lot of energy, since an incandescent lamp only uses two percent of its electrical power to

generate actual light. The idea we'd all turn up the heat because of the ban, seems an extreme assumption. In a living room setting, a light bulb will barely add to the temperature. Besides, we don't even use our central heating for a substantial part of the year, which doesn't seem to be taken into account in that calculation. On top of that, it's assumed that the electricity that's being saved in people's homes will be used by other sectors because of the regulations of the European Trading Scheme (ETS). Well, have them change the rules. I understand that may be hard because of the red tape and commercialization, but it can't be used as an argument to rule out common sense.

"Of course it's good to start saving energy as soon as possible. Still, I think we should have postponed the ban on the bulb. Our alternatives are not yet good enough. I've installed some LEDs in my kitchen only recently, and the light is just not very agreeable. Even if only for cutting

vegetables... The new generation of CFLs does have a broader light spectrum, and some models can be dimmed. That adds to the atmosphere. But we can do much better still."

"Not enough research is being done into the impact light has on our feelings anyway. Will a person in a room with CFLs and LEDs be equally happy compared to someone in a room with light bulbs? At TU/e's Intelligent Lighting Institute (ILI) that our group is also part of, we've carefully started conducting these studies. Within ILI, some fifty researchers from six different departments work together. We cover many aspects, ranging from technology to intelligent lighting to psychology. So we're also looking for alternatives for the incandescent lamp. To me, that bulb is history."



Photo | Bart van Overbeeke

Coordinator Lex Lemmens on reform of Bachelor education

Adventure with a great risk of damage

You just go ahead and try it. Reform the whole Bachelor education at TU/e within one year, so as to attract more students as of 2012, who, if possible, will also score better. Lex Lemmens did have some misgivings when asked to lead this revolution. "It is an adventure with a great risk of damage." Yet his motives prove to be stronger. "The challenge is together with the Departments to come up with something new. The question being, of course: am I going to pull it off?"

The biggest educational reform in the history of TU/e is in full swing behind closed doors. Within a year the Bachelor programs must be reshaped entirely. Postponement is not an option, was prof.dr.ir. Hans van Duijn's warning at the kickoff on Thursday June 9. "A revolution in the educational field which is crucial to the future of TU/e", according to the Rector. It would take less to give anyone sleepless nights. Not so dr.ir. Lex Lemmens. He is to head the revolution and does not seem to be weighed down by it at all. He even had time for a summer holiday.

Things are serious now, though. A timetable has been drafted with a tight schedule: on September 1, 2012, the educational reform must have been accomplished. "It is a very sharp deadline indeed. Why so? Because we can't allow anything to go wrong when we start. The new students we attract won't care at all if things are changed. They just want everything to run smoothly. The schedules have to be correct, and the lecturers have to be ready." A plan B has been drafted, in the event that September 1, 2012 should prove too early. In that case the reform will be implemented in phases. "Still, the whole system has been devised so as to carry everything through at once. I do not want to deny that when such a big project is involved, there may always be an unforeseen event causing us to slow down. I am not thinking in terms of mishaps, though."

"We are not diluting, not compromising quality"

The team around Lemmens has been composed on the basis of its expertise, and not to represent an interest group. "Which is great, for I can't do it alone and it generates support as well. For now the lecturers have very little to do with the new Bachelor College and the need for it. That's why we must get a process going to discuss the direction, the new programs. We shall be holding meetings in De Blauwe Zaal, as well as workshops and discussions in groups such as the University Council, which will be of a less technical nature." A remarkable change of course that raises eyebrows is the introduction of social sciences and life sciences. Should these be taught at TU/e? Won't they detract from the identity of the university as a bastion of technology? "The emphasis will continue to be on technology", Lemmens assures us. "However, in recent years our research has not focused exclusively on oil and machines anymore. It is concentrating on the user. How do we make a car more economical, safer and more comfortable

for a driver? What is the influence of a web design on an Internet user? That is a trend which you come across everywhere. Together with the Industrial Design and Industrial Engineering & Innovation Sciences Departments we have given the first signals that we are moving in that direction too. We want to give students the opportunity to combine engineering and technology with social sciences if they feel attracted to that option. Of course, we also intend to turn out very good physicists who may not be terribly interested in that. We will just offer students more combinations. Yet the free choice is linked strongly to coaching by lecturers. The new form of education is not a free-for-all. You will be given space to discover your strong points, but those points will really have to be strong. I do worry occasionally whether it is clear to the outside world that we are not diluting, not compromising quality. We have to avoid that misapprehension. We must make it clear that we are in firm control of the quality of a program and a diploma."

"The emphasis will continue to be on technology"

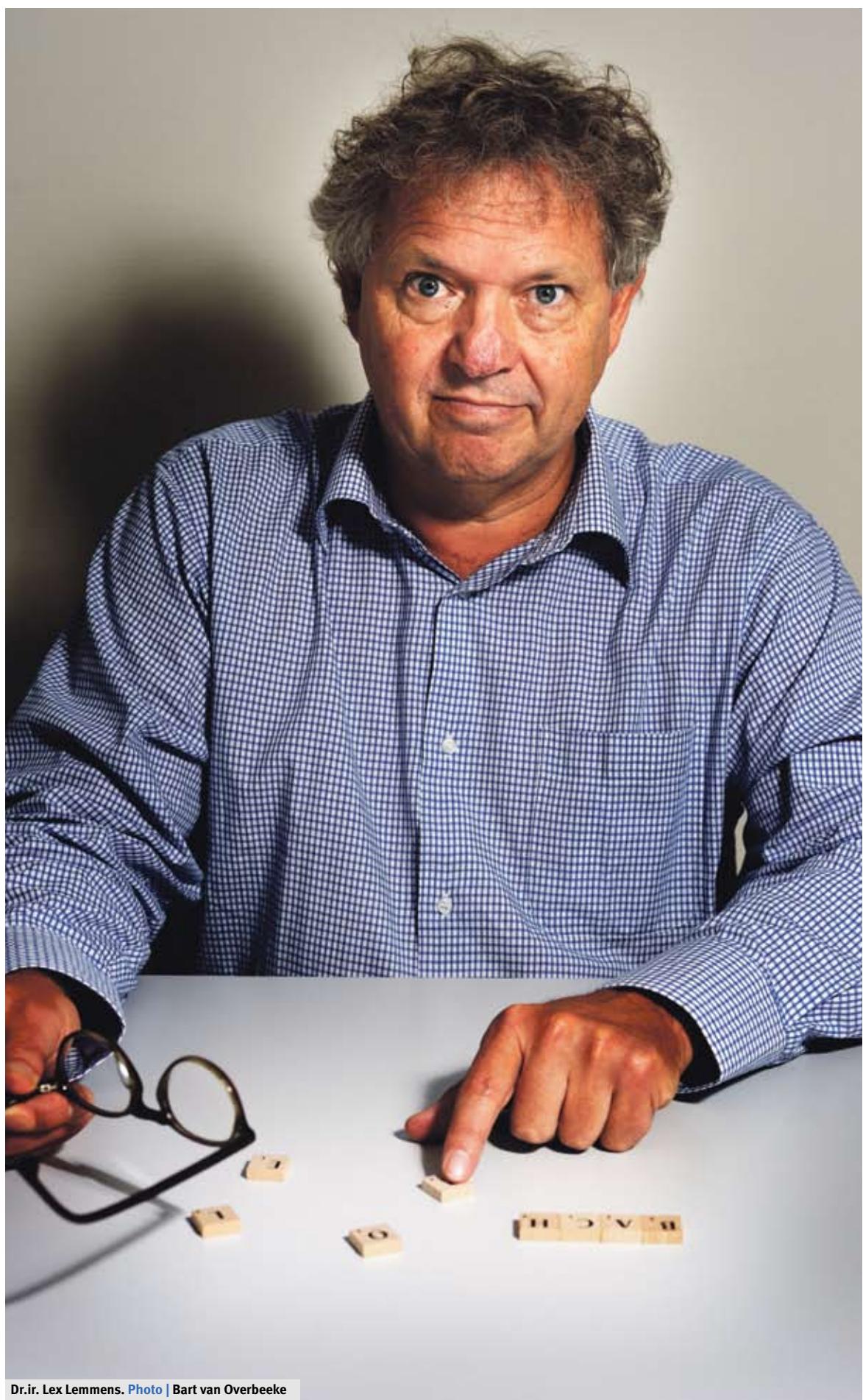
It goes without saying that Lemmens had his doubts when he was asked to lead the way. His choice was prompted in particular by his bond with TU/e 'as a whole'. "In Eindhoven I set up the Master study of Sustainable Energy Technology. It is fantastic to see how six Departments are joining forces to set up a splendid program. And whilst existing structures complicate matters considerably, contents and people will overcome that in the end. Such things really give me a boost. The reform of Bachelor education poses a similar challenge. To create something new together with the Departments, so that students can use all the good things from the different Departments, rather than getting bogged down within one Department because the program is so rigid as to make that impossible. Naturally there is a personal challenge involved for me, to see if I can pull it off. It is an adventure with a great risk of damage. Nonetheless I am already beginning to gain confidence when I see the enthusiasm of the people working along in the organization."

Lemmens is keenly aware of the limits involved. Offering more while the number of people remains unchanged requires extra efforts, extra time. "Our lecturers have research duties as well as educational ones. Both are equally important. Nevertheless we shall ask them to make an extra investment in education for a whole year. In return, their research time is guaranteed to be

safe after that one year. We want to achieve this by providing more extensive forms of education. Research has shown that the best thing to do is to get students to carry out assignments yourself. Deducting the feedback

required, lecturers will gain time this way. Anyone who invests in this, will get better returns later. At present we are making far too little use of new teaching methods. Anyone preparing their lectures thoroughly and making short

video films per subject, can decide on a different teaching method for the same subject in the second semester that will take less time. Or think of social media like Hyves, where students can help each other out." (FvO)



Dr.ir. Lex Lemmens. Photo | Bart van Overbeeke

Taming tremors with MRI

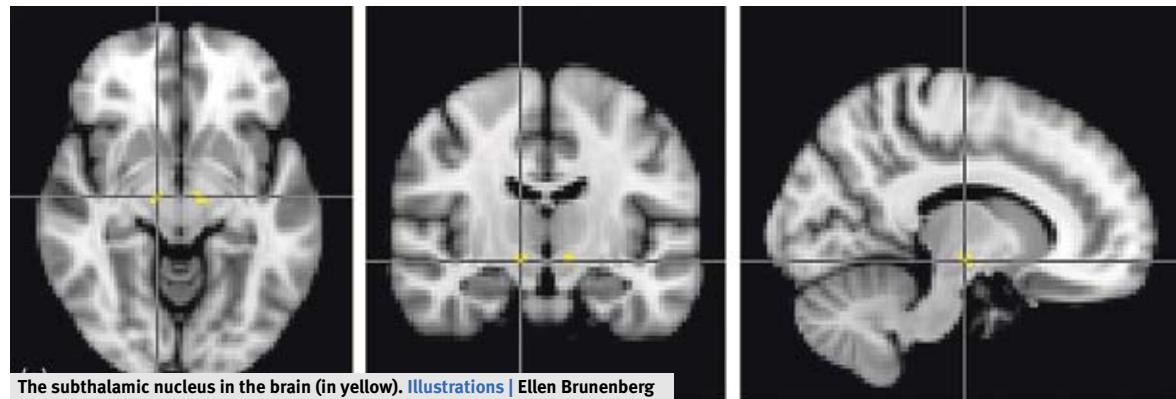
An electrode in the brain. It's known that 'Deep Brain Stimulation' may relieve patients of Parkinson's disease, but only if the electrode is inserted in the right spot. PhD candidate Ellen Brunnenberg employed advanced MRI-techniques to find this magic little area.

"The moment they flip the switch is very special", says ir. Ellen Brunnenberg. She's talking about the operations she's attended upon starting her PhD research. In the UMC Maastricht, home base of her second doctoral advisor Veerle Visser-Vandewalle, she's witnessed a brain surgeon inserting a minuscule electrode into the brain of a Parkinson's patient. And she was there as the patient -being fully conscious- immediately responded to the electric signal triggering the so-called 'Deep Brain Stimulation'. The shaking that's so typical for Parkinson's disease diminished - instantaneously.

Ever since the 1980s, Deep Brain Stimulation has been used to treat severe cases of Parkinson's disease, a brain disease caused by the death of

dopamine-producing cells, a chemical that transmits brain signals. With Parkinson's patients, the shortage of dopamine not only results in the well-known motor symptoms, but also causes mental issues such as depression and memory loss. Although medication to alleviate the symptoms has been in use since the 1960s, Parkinson's disease is still incurable and progressive. For some patients, brain surgery is the only option for relief.

For Deep Brain Stimulation, patients are given a sort of pacemaker that's generally implanted near the collarbone. It's then connected to an electrode in the brain by means of a hypodermic wire that goes along the back of the ear. Several weeks after the operation, patients have to come back to have the



The subthalamic nucleus in the brain (in yellow). Illustrations | Ellen Brunnenberg

signal adjusted for maximum effect, says Brunnenberg. "The adjustment of the signal doesn't require another operation. It's done with a remote control of sorts."

A popular place for the electrode is the subthalamic nucleus: an area in the brain the size of a peanut. This tiny area happens to play an important part in the motor symptoms that occur with PD.

Part of the subthalamic nucleus is connected to regions of the brain that

are responsible for locomotion. By stimulating this specific region reduces the motor symptoms. Unfortunately, other regions of the subthalamic nucleus are associated with certain emotional and cognitive brain functions. If the electrode is not in the exact spot and/or the electric current affects more than just the motor, those regions are stimulated as well, which may have severe consequences ranging from serious memory loss and uninhibited behavior to depression and extreme addiction susceptibility.

That's why it's of the utmost importance to have patients' subthalamic nucleus accurately mapped prior to the operation in order to localize the motor area. So far, researchers haven't succeeded in doing so. For the first time, Brunnenberg and her colleagues have managed to map the different regions in the subthalamic nucleus in living people. They employed advanced MRI-techniques, says Brunnenberg. "It's tricky to map the nucleus directly with an MRI, it's too much like the surrounding brain tissue for that. But as my first doctoral advisor Bart ter Haar Romeny likes to put it: should you remove all cities from a map of the Netherlands, the roads will still show you where the cities would have to be."

"The moment they flip the switch is very special!"

By means of several complicated tricks, MRI can show us the direction in which the water molecules in our brain move. And that shows us the route of the transport filaments: the roads of the brain's map. Those guide us to the subthalamic city center. "The connections between the subthalamic nucleus and the motor areas elsewhere in the brain determine what part of the nucleus makes up the motor area."

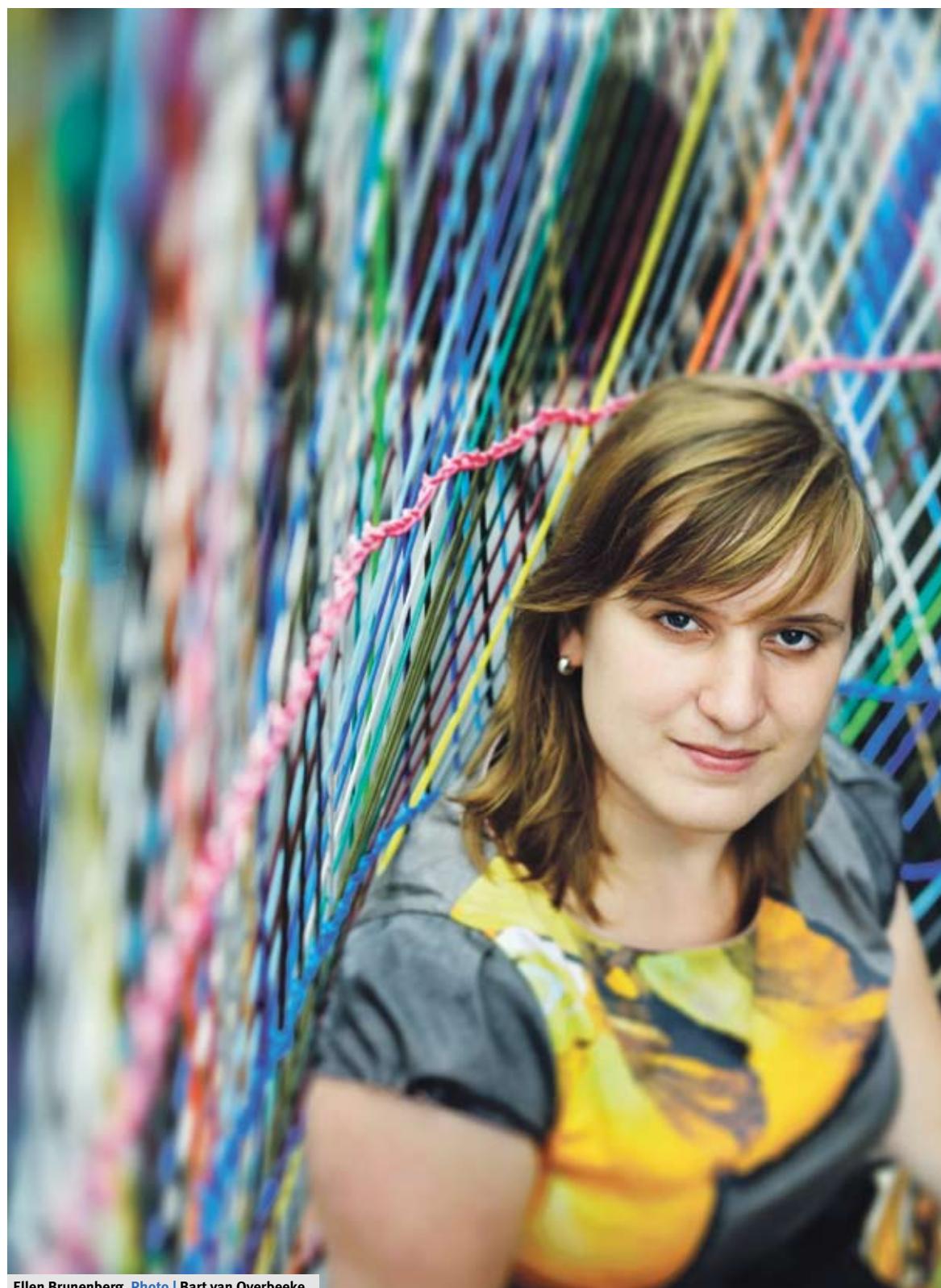
The research had healthy volunteers in an MRI-scanner for up to an hour and a half. Based on the water molecules' movements, Brunnenberg managed to map the entire structural connectivity – the highway system surrounding the subthalamic nucleus. "The results tally with what was already known from autopsy on the brain. The only difference is that we can now see it in living people."

By mapping the 'highway system' surrounding the subthalamic nucleus, there's still no way of knowing whether there's any traffic. To that end, Brunnenberg and her colleagues researched the

structural as well as the functional connectivity: the connection between the activity in different parts of the subthalamic nucleus and its connecting brain areas. Brunnenberg: "Said activity can be determined by gauging oxygen consumption. An MRI can show the difference between hemoglobin with and without oxygen. We've been able to prove that this functional connectivity, too – showing the traffic on the roads – can be a useful method in finding the motor area of the subthalamic nucleus."

Volunteers lay in the MRI scanner for up to an hour and a half

It has brought us closer to an effective treatment of Parkinson's disease by means of Deep Brain Stimulation, says Brunnenberg about her research. Prior to an operation, an MRI brain scan should inform the surgeon where to place the electrode for maximum effect and minimal side effects. But we're not there yet, says Brunnenberg. "We've been working with healthy volunteers. Because of their disease, it's much harder to have PD patients lie still." And it's very well possible that fixating the patient with medication will have an undesirable effect on the functional brain scan especially. "We're not even entirely sure whether the connectivity patterns of Parkinson's patients will look the same in a scan. That's to be determined by follow-up research. My doctoral advisors are determined to continue." (TJ)



Ellen Brunnenberg. Photo | Bart van Overbeeke