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# Cursor

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### Tuition fee

I've been faithful attending University Council meetings for as long as I can remember. Eight times a year, on Monday afternoon at four o'clock sharp, I humbly take a seat at my desk on the left, behind the chairman. However, somewhere in early June I happened to miss the first ten minutes of the 134th meeting. These meetings always start by quickly going through last meeting's minutes, so you never miss much.

Yet last Monday, during the 135th meeting, I found out that I had missed something interesting this time. In those ten minutes, Executive Board member Jo van Ham mentioned the amount that was spent on the new website: 1.2 million euro! Here and there people had already mentioned one million, but it turned out to be even more than that. And it wouldn't even have been so bad had the website been jaw-droppingly awe-inspiring. Between you and me, I feel they've merely placed a very expensive façade in front of the old website. We've already changed our old site – very durable, I have to say – into our temporary intranet website. It's still unsure how temporary it's going to be exactly, since a new intranet website will also come with a price tag, and TU/e is on a budget. Don't worry, though: last Monday, Van Ham said the Executive Board has learnt a lot from the whole website process. Well, they paid quite the tuition fee.

### PLEM

Confidential talks, spicy quotes, frank confessions. The only place these are safe is in the hands of a good lawyer. For journalists, interviewees can never be too talkative. The more fireworks, the juicier the story. Still, there are moments reporters hold back in what they share with the audience. Because sometimes, privacy is more important than a sensational publication. And pages don't stretch. These matters have to be considered every time. After an interesting and at times hilarious and frank interview with departing Professor Piet Lemstra, known for his ruthless comments on everything and everyone, a lot had to



be considered. The abridged epilogue PLEM wrote for Cursor may still sting, but a volume of all his outspoken opinions and exciting anecdotes would do him even more justice. Come on PLEM, give us those memoirs!

## ◀ 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?

### Executive Board promises: "OASE fixed before November"

September 20, 2011 - Study website OASE will be fixed before November, the Executive Board promised at the U-Council meeting of September 19. The promise is a result of nearly 2,500 complaints about OASE collected by student party Groep-één. "We're not trivializing any complaint", says Board member Jo van Ham. Extra budget will be made available to tackle the problems, and the Laboratory for Quality Software (LaQuSo) of the Department of Mathematics & Computer Science will be conducting stress and flow tests. There were over five hundred complaints on slowness alone, after Groep-één called on all students to forward their problems regarding OASE through Facebook.

Apart from said slowness, students are annoyed by the user-unfriendly interface, the fact the system barely works with the Chrome browser, and the issues involving registering and deregistering for courses and exams. On top of that, course material is supposedly hard to find if not lost altogether, and timetables lack clarity.

The Board member responsible - Jo van Ham - apologized and said he takes every complaint very serious. Still, he feels several comments are in order regarding the surge of criticism. Van Ham promised to make available extra means in order to tackle the most urgent matters.

### Architect for Green Carpet

21 september 2011 - MTD Landscape Architects has been selected to design the Green Carpet on campus. In the months to come, the bureau from Den Bosch will be realizing their idea of the new, green heart of TU/e campus,

in collaboration with university staff and students. Real Estate Management hopes the first phase of the Green Carpet will be finalized at the same time the MetaForum (the new W-hal) will be surrendered, in the Fall of 2012.



## ◀ Flashback

### Tuna 1968 versus 2011

At the tenth Tuna festival that was held in Eindhoven last week, they could be seen and heard once again: members of Tuna Ciudad de Luz, the Eindhoven Tunos who play the most beautiful Spanish tunes dressed in traditional attire. The Tuna's first crew is shown in the picture dating back to 1968. Over the years, both attire and music have changed, says former member Frans Zonneveld: "In 1968, we only wore a capa with a V-shaped sash (baca) over our blue exam outfits. We used to often play romantic rondas during balcony scenes with serenades for lovely damsels. I guess we weren't very musical back then. We were happy if we remembered the melody and lyrics, and if several guitar players were present. These days, they win prizes at international Certamens." (CS)

Photos | Tuna Ciudad de Luz and Bart van Overbeeke

## ≡ Clmn My 'comfort zone'



"Go abroad! Leave your comfort zone!" That was probably the main message of the opening academic year ceremony. In fact, leaving your home country is a challenge and can be a bit discomforting. I'm already abroad and I know what 'comfort zone' means. So, if someone asked me to describe my comfort zone in one word I wouldn't reply 'food', 'language' or 'weather'. I would say 'family'. Indeed, being around my parents and my younger brother is the most secure and comfortable I can get. Of course, I can keep in touch using Facebook or Skype. However, distance matters a lot. Let me illustrate that for you.

Imagine you have a guitar string. When it's not attached, both ends are close to each other. You can now try to pull the string's middle, yet no matter how hard you pull, you won't hear any sound. Next, attach the string to the guitar so both ends are far apart. Now, even small stress on the middle will cause a sharp sound. It's the same with our souls and those of our families. When we are separated by distance even small life stress causes mental discomfort, making us sound like this string. Returning to me: after arriving here I faced various types of stress of being an alien in the Netherlands. The most important thing I missed at those tough moments was time with my family. In this sense, leaving my comfort zone helped me to rearrange my life values and taught me to realize my priorities in life. So now, when I hear some of my friends complain about a lost iPhone or a broken car I just smile and think: "This is not what comfort is about. Only after leaving home I understood".

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



## X | Vox Academici

Prof.dr.ir. Gertjan van Heijst,  
chairman of the Committee for Scientific Integrity at TU/e

### Is science reliable?

Last week, a lot has been said about the scientific misconduct by Tilburg professor Diederik Stapel. He had made up the results of at least one publication. His colleague, professor Roos Vonk added fuel to the flames by stating that first and foremost, scientific research is meant to confirm hypotheses. It is statements like these that contest the notion of scientific integrity. It's a very touchy subject. After all, isn't every scientist confronted with fraudulent temptations every once in a while? Could the current maxim 'publish or perish' play a part in this? And should universities intervene with strict regulations, or is that too patronizing?

"Let me be clear: scientific misconduct is absolutely unacceptable and should have severe consequences", says Gertjan van Heijst, professor of Turbulence and Vortex Dynamics at the Department of Applied Physics and confidant and chairman of the Committee for Scientific Integrity at TU/e. "However, it starts very subtly. What to do about the white noise that occurs in measurements? In statistics, do you

exclude an unexpected peak? And then there's all these publications saying "a textbook example of..." What's so textbook about it? A scientist should be open and honest where their results are concerned. Always. An open atmosphere in the workplace - or in the area of expertise in general - can greatly contribute to that. I'm a major advocate of cooperation instead of competition. The latter only stimulates the hushing up of data."

"Many experiments make use of freely accessible data. That's a good thing, but it can be tough if these datasets are very elaborate, for example. Or if you're the first to use a new method or device. You don't want to give away everything at once. In the end, it's about the individual researcher, because they have the final say. Of course universities should be involved: have staff take a course in scientific integrity, and explain who they can turn to should problems arise. Still, having universities check the data seems useless to me. If data is subtly manipulated, then even peer reviewers won't spot the mistakes..."

"Thankfully, in the year I've been chairman we haven't had to assemble the entire committee for fraud at TU/e yet. These things should be handled immediately, like they're handling it in Tilburg right now. Unfortunately, you're always too late. Ideally, you'd want to nip fraud in the bud, before it's out in public. Too many of these events may damage the general trust in science. But how do you anticipate these things?"

"It's true that we, as scientists, constantly have to prove our worth to assessment committees, in order to apply for grants, but also to our peers. It can be stressful. And the cutbacks in education make matters even worse. We're being throttled, yet are still expected to perform at the same level. That has to stop. Education is this university's primary concern. We're teaching students to be independent, honorable engineers who'll later be able to find their own way in society. But for that, we need money, time, and a free reign..."(NT)

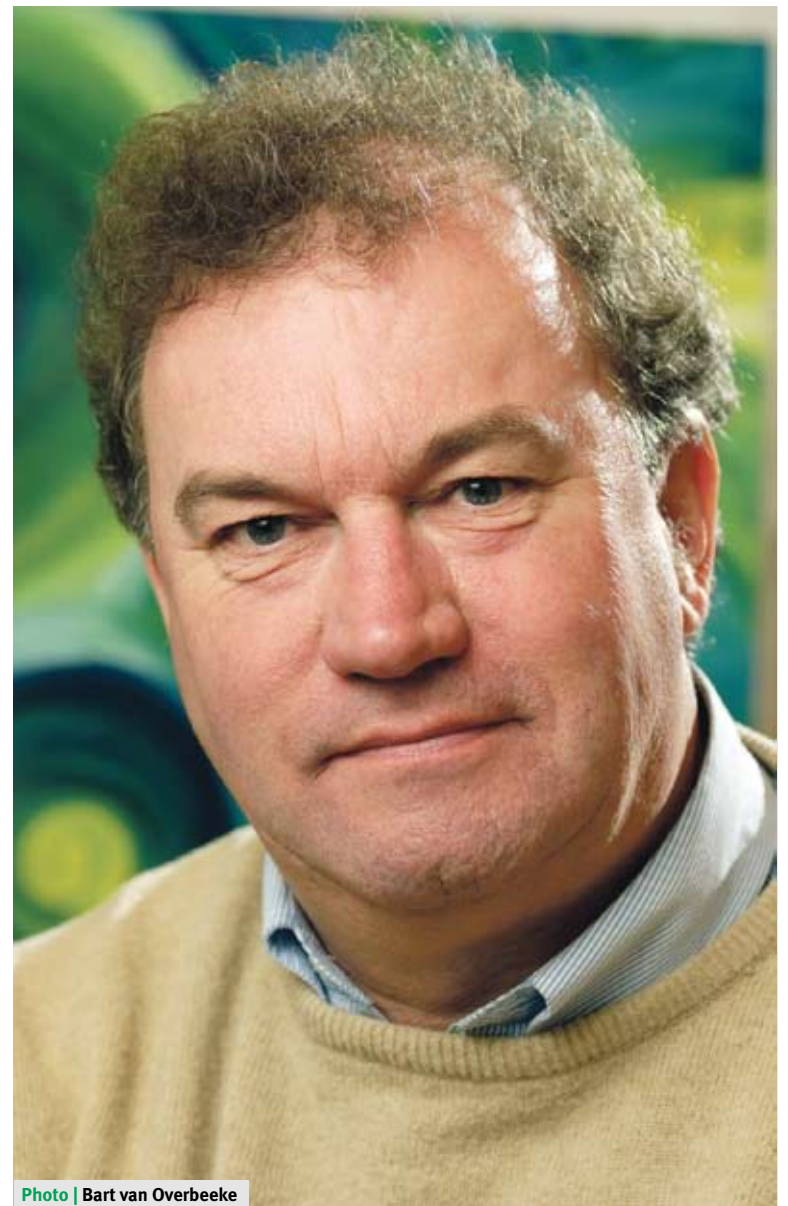


Photo | Bart van Overbeeke

## Tunafestival 2011





# PLEM leaving

**Beloved and vilified. Anything goes for Piet Lemstra, the professor of Plastics technology who prefers to call himself PLEM.**

**His career at TU/e is both undisputed and emphatic with two stints as dean. Although the anarchistic streaks of this native from Groningen arouse resistance somehow, both friend and foe agree: life is never dull with PLEM. “I do not accept any authority.”**

**On September 30 he will present his valedictory lecture after more than twenty-five years at TU/e.**

*In 1985 you switched from DSM to TU/e. What did you find?*

“The Polymers section in Eindhoven was virtually dead. Together with my friend and colleague from DSM Han Meijer, who also made the switch to Eindhoven as part-time professor in our group, I raised funds from companies for the construction of a laboratory. One of my first PhD candidates, Laurent Nelissen, proved to be a financial wizard. Everything fell into place at the right moment. Polymers were the top in those years. There was an enormous expansion. The Netherlands was second to none in polymers/plastics. Shell had new things, just like Akzo and Dow. The atmosphere was full of life.

As professor you could talk to kindred spirits from the industry, where the same academic level could be found. That’s gone now, unfortunately.”

*What caused it to disappear?*

“Around the turn of the century, petrochemistry changed from being a sunrise industry to a sunset industry. Within one year so many things happened: DSM sold its bulk plastics to Sabic. GE Plastic Research was shifted to Bangalore. Akzo sold its fibers, focusing only on paint. Shell moved away from polymers altogether, although it did stay on within the Dutch Polymer Institute (DPI). When I worked for DSM, there were dozens of people who turned their careers into scientific ones. They attended conferences, wrote books and were given the opportunity to do so. After the year 2000 this so-called corporate research disappeared entirely from the petrochemical industry. Via courses I trained and/or retrained some fifty PhD candidates, hundreds of graduates and more than a thousand youngsters in polymer technology. So I know what they do in the industry. Everyone is “busy, busy” and everything is short-term work. When I speak to those young people from the industry, they don’t seem to be unhappy. Then again, if I visit Artis Zoo on a Sunday afternoon and talk to a newborn monkey, it’s happy too. It doesn’t know any better.”

*What is your view on the future for polymers in Eindhoven?*

“Eindhoven Polymer Laboratories, our research school, is a big club. Eight professors, staff members, postdocs and PhD candidates, some three hundred people altogether. That’s an army you are talking about. The problem is: EPL is divided and there is no broadly supported view on the future. Professors have colossal egos, except myself of course, and they prefer to quarrel.

Friends must be found elsewhere in the world, not within the Department. Whereas staff members cooperate properly on the shop floor, in professional circles the atmosphere is like former Yugoslavia. A schism has arisen between the dominant group focusing on bio-inspired polymers versus the more down-to-earth plastic boys. The latter group, to which I also belong, is now moving out, just like I myself am retiring, Cor Koning is returning to DSM while his right hand Duchateau is going to Sabic. And who’s to follow, and all of this at a time when we are facing major cuts. Before you know it, the group will be dead..”

*Has the Netherlands lost its leading position in polymers?*

“Yes, decisions in the petrochemistry/polymer sector are made in boardrooms close to the oil wells or inside bank buildings by blokes who have no affinity with the Netherlands whatsoever. Europe and, by analogy, the Netherlands are bankrupt, but in the swamp we call Europe there are still some regions that are successful: Barcelona, Milan, Munich, Cambridge, Helsinki and Eindhoven as well. And the province of Limburg is going to invest money in bio-based economy, at Chemelot. Maastricht University has been asked to realize that and wants to cooperate with TU/e.

**“I think the pollution by plastics is blown up out of all proportion”**

However, our rector is looking towards Utrecht. I have nothing against that, Utrecht also has certain benefits, but it is five times bigger than TU/e. You would reduce yourself to a kind of applied department, I think. When our Department of Chemical Engineering and Chemistry (ST) really ought to have an interest in Chemelot. That’s where things will happen in the future. That’s where the money is, where the spirit is, with companies like Sabic, DSM and Avantium. All of them are focused on bio-based polymers. I’ve been asked to flesh that out as of October 1, and I’m going to do that while nourishing the thought that in time TU/e, in this case the ST Department, will join in.”

*Plastic has a very poor image in environmental circles. Do you feel co-responsible for that?*

“No I don’t, but the aversion to plastic is on the increase. In earlier days at primary school my daughter already learned songs in the vein of ‘get rid of plastics’. And recently my daughter-in-law asked me whether it was safe to let her child, my grandson, drink milk out of a polycarbonate bottle. I had never given any thought to that, but when you start googling, my word!

So much noise is made on the Internet. Surely there will be a plastic soup in the oceans, but that is a psychological rather than a social problem. There is no technology to cure the lack of human discipline. I think pollution is blown up out of all proportion. The problem is: who’s right? Science is not free from value judgments, and everybody has their own interests.”

*Does that negative image of plastics reflect on the Department of Chemical Engineering and Chemistry?*

“I’ve done two stints as dean. My aim was always to look for the proper balance. A university of technology must devote itself to science for the long term and must at the same time train people through research for a place in today’s industry. The buzz word is bio, nano, a thousand clicks away. When the big money is being made with plastics. It’s for a very good reason that DSM R&D is moving to China, where in Shanghai alone more than a hundred thousand engineers graduate every year. Chemistry is immensely unpopular in the Netherlands. Our Department actually has about fifty first-year students, which makes us the biggest one in the Netherlands. Once the industry really starts to pick up on this, companies are going to disappear here. It is peculiar that only one hundred and fifty kilometers from here, in Dortmund, a quota has been set for the study of chemistry. They have more than a thousand first-year students there. And why is that? We’ve been talking about it for years. The Netherlands is not really a country for technology. We are surviving thanks to our foreign PhD candidates. When you walk along the corridors in our Department, you sometimes seem to be in Delhi or Shanghai rather than in Brabant. Yet I do regard this as an advantage. Those youngsters have had their basic study paid by their home countries and they obtain PhDs here with projects that benefit the industry, and the best ones usually stay around. I strongly feel as if Philips and DSM prefer a Chinese holder of a PhD to one from Brabant. China is the future, after all. And Chinese employees trained in two cultures can be deployed at more locations.”

*You once started out as a chemistry teacher in secondary education so as to avoid being conscripted. What are your views on education today?*

“Students just gamble at written exams. They’re afraid of taking an oral exam. You can find out within fifteen minutes whether they understand the subject. If they don’t, you put them to work again, and then the score is one hundred percent. Ah well, education,

I don’t know. I’ve gone off it altogether. I refuse to go along on that continuous downward slope. When I was dean, I spoke to many lecturers who’d had their fill of education. Poor results, scrawled answers. In China this is much easier, there everybody gets straight A’s. But then you get engineers who build trains that don’t work.”

*One thing you did together with Paul Smit was develop the polyethylene fiber Dyneema. A great commercial success. Are you as strong and resilient as that fiber?*

“That’s a real poser. I do not accept any authority, I’m highly sensitive to that. When someone tells me to do something, I don’t do it. That’s my attitude to life. I think that I don’t raise myself above other people. Everybody just calls me PLEM. Although I have a big ego, I try to mitigate that. I do have a big mouth, a very big mouth. I’m from a very strict Dutch Reformed family from Groningen. Fortunately I have managed to shake that off, although you never really get rid of it entirely. The only thing that I’ve retained from the Bible is from the book of Ecclesiastes ‘All is vanity and a striving after wind’, so there’s no higher purpose to life. I season my existence with humor. Problems don’t exist and everything is relative.”

*Do people know the real PLEM?*

“No, perhaps not. Maybe I am hiding behind a certain image. Usually it’s wrapped in a kind of jolly atmosphere.

Nothing is a problem, anything goes.”

*One day after your valedictory lecture you will celebrate your 40th wedding anniversary. Have you had time for a private life?*

“In my DPI days I was never at home. Every night there was something or other I had to do. My wife also has a life of her own. I have a very kind and beautiful wife. In the old days in Groningen everybody was in love with her, because she was a singer in a band.

**“When you walk along the corridors in our Department, you sometimes seem to be in Delhi or Shanghai”**

Why she has stuck it out with me for forty years, I don’t know. Meanwhile we do have the necessary cement in the form of three fantastic grandsons and maybe that is the sole purpose in my life now. My only son is in Brazil where he runs his own business in bio-based plastics. I also try to help him if I can and then it is exit, keeping in mind Psalm 103 ‘As for man, he flourishes like a flower of the field, for the wind passes over it, and it is gone, and its place knows it no more’. (FvO)



Photo | Bart van Overbeeke



# An in-depth look at the development of bedsores

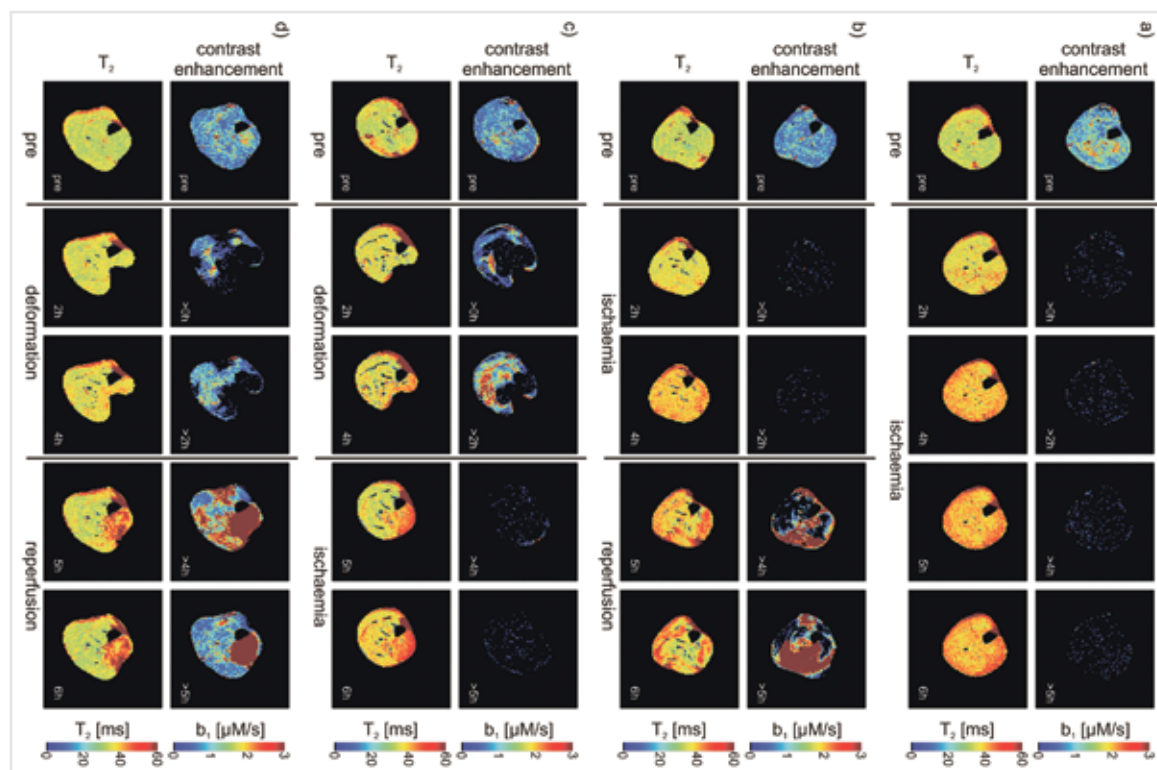
A urine test for the early detection of deep muscle damage that, without proper action, could become a bedsore. A lot more research is needed, yet in a pilot study Sandra Loerakker showed it may be feasible. For her PhD at the Department of Biomedical Engineering, she researched the development of deep tissue damage, which is especially problematic for people suffering from paraplegia.

Bedsore (pressure ulcers) develop when pressure is applied to the skin. Regular perfusion is obstructed, due to which skin and underlying tissue may necrose. Apart from that, tissue deformation in itself can also lead to damage. Pressure ulcers are prevalent among bedridden patients or elderly people, or people that are bound to a wheelchair due to paraplegia, for example. The condition is a major, time-consuming and costly problem for hospitals and nursing homes, with the latter facing one in four patients suffering from pressure ulcers, according to research.

For her PhD research, Loerakker studied the underlying damage mechanisms that result in bedsores. To that end, she conducted several studies with rats that were placed under an MRI scanner in a specific position – anesthetized. The rats had a stamp pressed into one of their hind legs for two hours, after which the level of muscle damage was evaluated. The MRI images have also

been used to develop computer models that can calculate the tissue deformation. “The damage can often only be seen in a narrow area that has great overlap with the area in which tissue deformation occurs. Deformation, then, is an important factor in the development of progressive muscle damage,” Loerakker explains. “It’s very important to prevent major deformation in muscle tissue. We’ve noticed that muscle damage only occurs within a two-hour time frame if the level of deformation exceeds a certain value. We have reason to believe this level is exceeded when lying on a gurney or operating table, for example, which are often hard surfaces. These patients run the greatest risk.”

Ischemia, or restricted blood supply, also proves an important factor that Loerakker researched in a series of more elaborate experiments. In these experiments, the blood vessels in a rat’s leg were blocked for four to six hours. “It was striking to see that perfusion didn’t go back to normal in all cases,



These MRI images show a cross section of a rat’s leg that’s been strained for four hours. The top row displays the perfusion in the rat’s leg, which after release of the clamp, doesn’t fully return. The

areas the perfusion doesn’t go back to normal overlap with the areas in which the damage of muscle tissue is most serious (lower row of images, two rightmost images).

although we did expect it to.” Loerakker shows several MRI images (see illustration) displaying the blood supply with the help of a radiocontrast agent. “There’s a clear correlation between the areas where the blood supply didn’t recover and the areas where tissue damage remained or even worsened.” The researcher compares it with the compartment syndrome that can occur after a fracture. With this syndrome, the blood supply is disrupted within a certain compartment of the limb due to raised pressure within the compartment.

## Decubitus ulcers major, time-consuming and costly problem

Should the supply not recover, lack of oxygenation occurs, causing nerve failure and muscle necrosis. Although the exact values for humans and rats will probably differ, the trends and processes in this field are definitely comparable, Loerakker says.

For her PhD research, Loerakker has worked with the University of Alberta, among others, where one group experimented with pigs. “Their researchers are developing a method to keep muscles into shape and preventing muscle damage with electrical stimulation. In order to study the effect of said method, they’ve used a flat punch to imitate the effect of sitting with animals. I used the study’s results to develop a computer model that

determines the deformation that occurs in muscles, fat and skin during sitting. It turned out that deformation not only occurs widely in muscle tissue, but in fat as well.”

For another part of her research, Loerakker worked with a revalidation center in Hoensbroek. For five days, blood samples were taken from eight paraplegic patients (one of which suffered from bedsores). The blood was tested on four biomarkers: three proteins connected with tissue damage (creatine kinase, myoglobine, and heart-type fatty acid binding protein), and one connected to tissue damage (C-reactive protein). In the course of one week, the same blood tests were done on seven healthy volunteers at TU/e. All test subjects kept a diary on their activities in that week. “For someone with a relatively active lifestyle, certain blood levels generally tend to be a bit higher,” says Loerakker, “But we still expect these to be relatively low compared to the values for someone who’s developing a bedsore.”

The two main domains of her research (MRI experiments and biomarker research) culminated in Chicago, where she’s resided for three months. At Northwestern University, she conducted a pilot study into the release of biomarkers during a six-hour period in which rats’ legs were pressured. During her experiments in Chicago, Loerakker found two biomarkers in both rats’ blood and urine. One of these, the protein myoglobin, had increased considerably, “especially in urine. We didn’t expect to see such an increase in urine. It was a wonderful result,

especially from a practical point of view. After all, a urine test is much less strenuous for a patient than a blood sample. It’s therefore very interesting to look into this.”

According to the PhD graduate, she’s not the first to have studied deformation and ischemia in the development of pressure ulcers, “but we have been the only group in that field that’s examined the damaging process in such detail. It’s mostly because we’ve been able to conduct out tests in a very controlled environment in an actual scanner, despite the limited space available. It’s quite unique for pressure-ulcer research.”

Her research, and especially the biomarker aspect of it she conducted in Chicago, is a great starting point for follow-up research, says Loerakker. She’s not about to do that herself, by the way: after her defense she’ll be working on the tissue engineering of cardiac valves. (MvdV)

Last Tuesday, September 20, Sandra Loerakker defended her dissertation ‘The relative contributions of muscle deformation and ischaemia to pressure ulcer development’.



Sandra Loerakker. Photo | Bart van Overbeeke